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C U A D E R N O S D E L C E D L A

Small-Scale Gold Mining in the Amazon

*The Cases of Bolivia, Brazil,
Colombia, Peru and Suriname*

26



SMALL-SCALE GOLD MINING IN THE AMAZON

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IN THE AMAZON

THE CASES OF BOLIVIA, BRAZIL, COLOMBIA,
PERU AND SURINAME

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Cuadernos del CEDLA Editorial Board

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Arij Ouweneel

Cuadernos del CEDLA, No. 26

ISBN 978-90-70280-18-5

NUR 947 Internationale ontwikkelingsstudies

© 2013 CEDLA, Amsterdam

Centre for Latin American Studies and Documentation

Keizersgracht 397

1016 EK Amsterdam

The Netherlands

www.cedla.uva.nl

www.cedla.uva.nl/50_publications/cuadernos.html

printed by HAVEKA, de grafische partner, Alblasterdam

Acknowledgements

GOMIAM is a comprehensive research project on small-scale gold mining and social conflict in the Amazon region. In GOMIAM, over twenty researchers from six different countries contribute to the collection and analysis of data on the role of nation states, local populations, miners, migrants, pollution of the natural environment, policies on different levels and conflicting claims to the access to the gold, in the social conflicts found in the Amazonian small-scale gold mining sector. This book is a first result of their efforts. GOMIAM is funded by the WOTRO program CoCooN: Conflict and Cooperation in Natural Resources in Development Countries.

We would like to thank CEDLA for enabling the presentation of these first research results from the GOMIAM project in the form of this Cuaderno publication. We thank all miners, the people in the mining communities, the service providers, the government representatives, mining companies and non-governmental organizations and all other people involved in gold mining in the Amazon, for their willingness to share their knowledge, experiences and concerns with the GOMIAM researchers. We expect this publication will contribute to a greater understanding of small-scale gold mining in the Amazon. We hope that more knowledge and awareness will be of help in the development of adequate policies for the social and environmental regulation of the sector and the improvement of the livelihood situations of small-scale gold miners and local communities in Bolivia, Brazil, Suriname, Colombia and Peru and the rest of the Amazon.

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SMALL-SCALE GOLD MINING IN THE AMAZON

LEONTIEN CREMERS AND MARJO DE THEIJE

Introduction

This publication is a result from the GOMIAM project, an ambitious research project building on the comparison of small-scale gold mining in five different Amazon countries: Bolivia, Brazil, Colombia, Peru and Suriname.¹ The project works on the development of an integrated social, political and technical approach of small-scale gold mining, with the aim to diminish social and environmental conflicts in the sector. In each project country, an interdisciplinary team carries out research, which is shared and discussed with a wider group of stakeholders in the region. By focusing on both social and technical aspects of gold mining, and giving a voice to miners' ideas and needs, the project wants to contribute to policies and interventions that benefit the small-scale miners and transfer small-scale mining into a more sustainable and socially just sector.

In this publication we present a panorama of small-scale gold mining in the Amazon. Using five country studies, we give an overview of the social, economic, environmental and political characteristics of small-scale gold mining in the Amazon region. Although the current document is by no means a complete inventory, it points out a number of key characteristics and issues that are important in the current day discussions about small-scale gold mining. The five project countries and case studies were chosen, because they represent a number of common features of small-scale gold mining in the Amazon, as well as some specific characteristics that are important to

consider and compare. Together, they give a good overall impression of the sector's appearance and the challenges it currently faces.

With small-scale gold mining we refer to mining that is labor-intensive, makes use of simple (including artisanal) technology and limited mechanization, is mostly informal, outside legal frameworks of nations and out of sight of national policies (ICMM 2010). This form of mining has been taking place for over centuries, providing a livelihood to many hundreds of thousands of mostly poor people. The extent of the activity fluctuates, responding to different factors, such as the international gold price and policy measures taken by national states that can stimulate, but also hamper the small-scale miners in their quest for gold. When the extent of the activities increases, the small-scale mining related problems increase accordingly. Most small-scale gold mining in its current form brings serious health and environmental hazards. It is characterized by disordered occupation of territories, chaotically organized mining operations, and dangerous working conditions. Gold mining causes deforestation, uncontrolled release of mercury, and the deterioration of soils and riverbeds (Bridge 2004). The full scale of these negative impacts is yet unknown.

With the expansion of the activity and its related problems, research and action are required. Previous research on small-scale gold mining in the Amazon has been done, focusing mainly on mono-disciplinary and technical research subjects, such as mercury impacts and deforestation, (see e.g. Akagi 1995, Malm 1998, de Kom et al. 1998, Grandjean 1999, Peterson and Heemskerk 2002, Hilson and Vieira 2007, Spiegel and Veiga 2007). Looking at the dynamic character of the sector and the rapid changes that are occurring, and the narrow focus of most of the research work done so far, we hope that our integrated and multidisciplinary approach contributes to the current day discussions and decision making processes.

As stated above, small-scale gold mining is an important livelihood opportunity in the entire Amazon region. Since most of the mining is done in informal spheres, exact numbers are not easy to come by. In the five countries of study however, we estimate there are currently more than 500,000 small-scale gold miners active (see table 1). This number does not yet include the number of people that depend indirectly on the small-scale mining sector by providing services to the miners. These are many hundreds of thousands more. For Suriname for example, it was calculated that small-scale gold mining supports the livelihoods of around 12 percent of the population (CASM 2009, Hammond et al. 2007). Worldwide, it is estimated that over 100 million people in more than fifty countries depend on small-scale gold mining, while 15 million are directly employed in it (Spiegel and Veiga 2007, Telmer 2008, cited in ICMM 2010).

Table 1. Estimation of the number of (small-scale) miners in the countries of study

Country	Small-scale gold miners
Peru	60,000
Brazil	200,000
Colombia	182,000*
Suriname	20,000
Bolivia	80,000
Total	542,000

*This includes both small-scale and large-scale gold miners (based on Dane 2012)

Source: From GOMIAM research

Currently, gold mining -including both large-scale and small-scale- is one of the most important economic activities in the Amazon region. Peru is the world's fifth producer of gold, and Bolivia, Brazil, Colombia and Suriname are all in the top thirty. In table 2, we present some details on gold production. The production numbers include both large and small-scale gold production. In the last column we give an estimate of the contribution of small-scale mining in 2009, which is quite substantial.

Table 2. Gold production in project countries (2006 and 2009)

Country	World ranking	2006 Production	World ranking	2009 Production	Production small-scale mining*	%
Peru	5.	202,822 kg	6.	182,391 kg	23,500 kg	13%
Brazil	15.	40,075 kg	12.	60,000 kg	6,960 kg**	12%
Colombia	21.	15,683 kg	14.	47,837 kg	33,486 kg	70%
Suriname	26.	10,426 kg	25.	28,585 kg	16,487 kg	58%
Bolivia	28.	9,628 kg	34.	7,000 kg	3,550 kg	51%
Total		278,634 kg		309,421 kg	83,983 kg	26%

Source: based on data from Brown 2010 and Index Mundi 2012.

*Estimates from GOMIAM country chapters.

**Estimate from 2010.

Historically, gold extraction has played an important role on the Latin American continent. We will look into this more closely in the following paragraph. Currently, with the high world gold price, more actors have become interested in the gold sector. This concerns not only academia, but also the media and public authorities. They ask questions such as: Can small-scale mining be sustainable or environmentally friendly? Should small-scale miners be formalized or eradicated? Where can small-scale mining best take place? These questions are not easily answered and need profound knowledge of different disciplinary fields and local contexts. In this publication we want to contribute to this knowledge.

In this first chapter, we give an introduction on small-scale gold mining in the Amazon. There are some general issues that we consider important to deal with, before diving into the country cases. First, we give an historical sketch of gold and its significance throughout time. Then we explain into more detail how the rising international gold price has ignited a new gold rush. After this, we talk about the technology used in small-scale mining and how the conditions in the Amazon region determine certain types of mining. In continuation, we explain into more detail why it is important to look at social and cultural aspects of gold mining, as well as the trans boundary character of gold mining in the Amazon. Finally, we will introduce the five case studies. The specific features and developments in each country will be discussed by the authors in the chapters that follow.

History of gold mining

People from many early cultures around the world valued gold, equating the shiny metal with power, beauty, and the cultural elite. Its use was ceremonial, a medium for advertising proximity to the gods (Bernstein 2000). Also in Latin America, gold mining goes back to pre-Columbian times. Around 1200 BC, the Peruvian civilization Chavín was making gold ornaments by hammering fine sheets of metal and decorating them with embossing. The technique of casting gold was developed by the Nazca people in the deserts of southern Peru before AD 500. The peak of technical skills came during the Chimú Empire between AD 1150 and 1450, when goldsmiths perfected lost wax casting, alloys, welding and plating (Bernstein 2000, Yenne 2011). This technique was adopted by the Incas, relatively shortly before they had to fight their battle against the Spanish hunger for the shiny metal during the invasion in the 16th century.

Here, two different worlds collided. One in which the use of gold was ceremonial and ornamental, confined to the use by the Inca nobility and to honor the Inca gods, and one in which it had a monetary value and was a very scarce good. One of the reasons for the Spanish crown to sponsor the Conquest of the New World, was the stories told about the riches of gold and silver that were used by the peoples on the New Continent (Yenne 2011). A well-known story is that of Inca Atahualpa being captured by the Spanish conqueror Pizarro and offering a room full of gold in return for his release. Once this was redeemed, the chamber contained many fine golden ornaments from royal palaces, temples and public buildings from over the entire Inca empire, together representing the equivalent of twenty years of production by the Peruvian gold mines. After shipping some of these treasures to the Spanish crown, Pizarro let the rest of the gold be

melted from adornments to money: in total 1,326,539 *pesos d'oro* (Bernstein 2000).

The rush for gold was repeated several times in different places on the Latin American continent. At first, during the feudal and colonial era, gold was a factor of accumulation in direct relation to coin and paper money exchange value. In the seventeenth and eighteenth centuries the Portuguese colonizers of Brazil brought many *bandeirantes* to a region that soon got the name *Minas Gerais* (Hemming 1978). By the end of the nineteenth century the Guianas attracted miners from the Caribbean, North America and Europe (De Theije forthcoming 2013). In the twentieth century, several Amazonian locations became the focus for the search for gold, in areas as remote as Brazilian Tapajós and Peruvian Madre de Dios (Cleary 1990). As our current day capitalist economies grew, the demand for gold increased accordingly and mining for gold remained a lucrative business. Although the direct link between gold and our monetary system was officially cancelled in 1971, the demand for gold as an investment has remained high, which together with other demands for gold, such as industrial applications and the growing demand for jewelry, let the world gold demand continue to increase.

Over time, large-scale, highly mechanized gold mining has gained importance in terms of gold production and revenues for governments and national and foreign companies. However, small-scale gold mining still remains an important livelihood opportunity for the local population and migrant miners, which appears in different forms. As we will see in the following chapters, in some scenarios, small-scale mining is an activity with a long historic trajectory, forming part of a diversified livelihood strategy in combination with agriculture and other income generating activities, for example tourism. In these cases, the impacts of mining are relatively low as we will see in the Colombia chapter, where the case of Chocó is presented. However, these experiences are scarce and have their own specific problems. We also see new mining activities introduced by large groups of migrant miners in more pristine areas of rainforest. In Peru for example, the new mining activities implicitly involve more drastic changes for both society and the environment in which it is taking place.

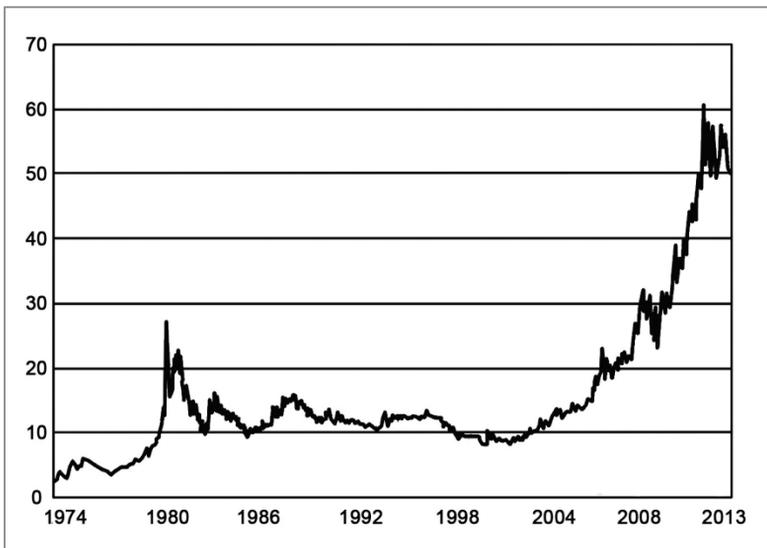
The expansion of small-scale gold mining over the centuries did not go without resistance and conflict. Also today, these conflicts between indigenous and local populations, miners and public authorities, and the effects on the natural environment get frequent media coverage.² The main message of these reports is that small-scale mining brings nothing but destruction and despair. Although we do not deny the problematic nature of the sector, we also assert that small-scale gold mining is an historical fact and it is not likely to disappear very soon. Tackling the problems of the sector will require policies to

address issues as varied as the conflicts themselves and putting them in an historical perspective.

Increasing international gold price

Gold has attracted people throughout all times, because of its beauty and easy workability and as a symbol of wealth and prosperity. It is valued for a number of special characteristics: it does not rust or corrode, it is a very good conductor for heat and electricity and its high malleability allows it to be flattened into extremely thin sheets. This is why gold is used in many modern processes and appliances, for example cellular phones, computers and televisions, which all contain very small amounts of gold.³ Since gold is a scarce resource and so highly demanded, it is costly. Over time, its value fluctuates, but in the last forty years it has dramatically increased, from around 500 USD/kg in the 1970s, to an astounding 60,000 USD/kg in 2011 (see figure 1).

Figure 1. Gold price per gram in the last 40 years in USD



Source: goldprice.org 2012.

Why did the gold price rise so much and why has the rise lately been so sharp? This is mainly attributed to the fast rising demand for gold, in combination with the limited availability of the metal over the last years. Demand is high, because people consider gold as one of the safest investments in times of financial crisis. Figure 1 shows that since the start of the credit crisis in 2008, the value of gold has skyrocketed. When the international bank sector was close to a collapse,

the first wave of unrest made people with savings resort to buying gold (Arnold 2011). Investors choose gold, because contrary to money, it preserves its value. If the amount of available gold is limited and central banks increase inflation by excessive money creation, then the gold price has to increase accordingly. There is an implicit assumption to this that the demand for gold, for example as jewelry or as dental filling, does not diminish (*ibid.*). The image of gold as stable in value needs some nuance however, since in real terms with inflation factored in – this was not done in figure 1 – the price of gold has been going down since the eighties and has only recently improved slightly. We could say that the motive for the demand for gold in times of crisis largely has a psychological character. One does not buy gold because of its intrinsic value, but because of the estimation that other investors will start buying gold, keeping demand, and prices, high (*ibid.*).

Besides the financial and economic crisis, another factor that has had effect on the demand of gold has been the growth of the economies in countries such as China and India in the past decade. These large industry-based economies consume increasing amounts of primary resources among which gold, not only for industrial processes, but also in cultural contexts such as wedding ceremonies. In combination with the uncertainties in the financial world, this will likely cause the gold price to rise even further in the time to come (Arnold 2011).

The rising gold prize makes it more attractive to start delving for this precious metal. More investments can be made in order to obtain the gold. Gold reserves that did not seem profitable, suddenly have become attractive to be mined. Global mining supply has therefore peaked in the last decade. The demand for gold still surpasses the actual production however.⁴ That is why the price remains high. To meet the demand, the primary mined gold has to be complemented through recycling of gold from jewelry and waste and the sale of bank gold reserves.⁵

At the same time, more and more producers suffer from declining ore grades, meaning that all the easily mineable gold has been extracted and there are lower gold percentages in the remaining primary mined material. Also political obstacles have made it harder to open new mines or acquire mining permits. As a logical result, disputes and conflicts occur over territories and deposits. This involves small-scale miners who fight over the best places to find gold, but also small-scale miners against large-scale mining companies, for example when the latter acquires an official permission to mine the gold field where traditionally small-scale mining has taken place. This last example we will see in more detail in this book in the chapter of Suriname. Such conflicts affect the miners, their families, their

communities, but also the region and eventually also have an effect on the amount of gold produced in the country.

Overall, gold production is increasing on the Latin American continent. This is partly due to the opening of large-scale mines (e.g. Yanacocha in Peru, Gros Rosebel in Suriname) (British Geological Survey 2010). In 2009, the registered production of gold in the five countries of the project was over 300,000 kilograms of gold (see table 1), a figure in which a part of the gold produced by small-scale miners is probably not even counted, as it is produced by informal activities that do not take into account the formal rules and boundaries of state systems and borders. As the financial and economic crisis continues, the gold price is not likely to drop in the time to come and with that, it is likely that small-scale gold mining in the Amazon will only continue to grow further, making more attention from national and international levels indispensable.

Gold mining technology

Gold mining is the process of collecting ore and separating the gold from the rest material. This basic principle is applied in many forms, using gold mining technology that varies from very simple, manual techniques to mechanized and more sophisticated mining processes. An important variable is the type of gold deposit, which can be primary or secondary. Primary gold deposits generally need more sophisticated machinery and higher investments to separate the gold from the ore. Small-scale gold mining takes place mostly in secondary deposits, which can be eluvial, colluvial or alluvial and contains gold in very small particles. These particles eroded from the primary deposit and were transported by gravity and/or water to its current position. Since gold is heavier than other materials, it accumulates at certain points, and these are the places that the miners look for. As Cleary (1990) indicates, in some cases, the miners will also mine the primary deposits where the fine gold particles came from, depending on the type of machinery they have and are able to transport to the mining site.

Traditionally, hand tools were used to do the extraction process. The gold pan, or *batea* in Spanish and *bateia* in Portuguese, is still a characteristic tool that is used by almost all small-scale miners, especially in the prospecting and final concentration phase. Nowadays, more modern equipment helps to make mining less arduous or mine in places where manual mining would not have been possible. For example, the primary gold in hard bed rock can be detached by using dynamite, after which crushers and mills break up the ore into smaller particles to extract the gold. Another example is the use of pumps and motors to 'push slurry' (the gold containing material

mixed with water from a high pressure hose). The gold rich effluent is carried over a longitudinal mat in a sluice box, where the gold is separated from the water, sand, stones and other minerals. The mechanized mining form may also entail excavators and bulldozers, but in that case the size and impact of the activity inclines more towards a medium sized gold mining operation.

Alluvial gold is also retrieved from river beds by means of a system of suction hoses on top of a raft, carrying the equipment to process the mined material and extract the gold. Depending on the size and level of technology used, these boats are called *balsas* or *dragas* (these are Spanish/Portuguese terms for resp. smaller and larger rafts). Often a group of these boats are tied together to collectively search the rivers for rich deposits.

As explained above, gold is mined on different scales, varying from artisanal mining to large industrial mines. With the term small-scale mining, we may think of a static form of gold extraction. However, in practice it should be seen as a gliding scale, from sporadic, entirely man-driven mining, towards a more permanent activity and more mechanized procedures in the different stages of the extraction process. Once a miner has started mining and saved some financial means, he or she will consider buying equipment to make it easier to mine larger quantities of material in less time and with less effort. The use of pumps, excavators and bulldozers is therefore more and more a common sight in Amazonian gold fields.

Mercury is traditionally used in small-scale mining to enhance the gold recovery. Gold binds with mercury to form a heavy amalgam. This way it is possible to collect the very small gold particles that would otherwise have washed away. Once the operation has ended, the amalgam is collected and the two materials are separated again by heating the amalgam with a torch, which vaporizes the mercury and leaves the solid gold. This process has potential health hazards, since mercury vapor is toxic and can cause various health problems related to the nervous system and internal organs. At the same time, the fluid mercury used in the operations is released into the environment and can turn into the more toxic methyl-mercury, which builds up in the food chain and causes severe malfunctioning in human beings in the long term.

The mechanization of the mining process means a higher rate of return for the miner but at the same time, it implies a higher impact on the surroundings, since much more forest is uprooted and larger volumes of sediment-rich water are discharged into the surrounding water bodies and not to forget the higher levels of mercury that is released into the environment.

The mechanization of the gold mining also has consequences for the organization of the mining process. Several persons have to work together to operate the different devices and share the work load. In

the Amazon region a variety of arrangements between individuals are at the basis of the work teams. In Colombia, communities work individually or in groups, using artisanal methods, such as *Mazamorreo*, *Zambuyidero* and *Cascajero*, which can mostly be done on an individual basis and need little additional organization. Often, women are involved in these activities. When the scale of the operations increases, the work is mostly done by men, since it involves heavier duties and the use of machinery. This shift in technology has an impact on the participation of women in the mining fields. Another form of organization can be found in Bolivia, where historical processes have created mining cooperatives. This organization form is becoming more important in the Bolivian mining field where they operate the *balsas* on the river, under increasing state pressure. The same goes for the Peruvian case, although the organization levels here are still less developed. In the Bolivia and the Peru chapters respectively, a mining cooperative and other miners' organizations working along the Madre de Dios river are described into more detail.

Social and cultural aspects of small-scale gold mining

Technical and environmental aspects of mining generally receive more attention than the social and cultural context. Attempts to improve the mining conditions of small-scale miners have had limited impact. The intervention mechanisms are predominantly of a technical order and do not take into account the complex socio-political realities in gold mining areas. One of the principal fields of action has been the use of mercury in the process of gold extraction. The pollution of the environment with mercury can be limited, using a closed container to burn off amalgam. This device is called a retort and has been introduced to small-scale miners in the entire Amazon region. Nevertheless, it is not generally accepted or used. Miners provide a variety of explanations for this, from disbelief about the harming character of mercury, to distrust about the chemical process inside the retort, or the conviction that it only works with large quantities, and not with the volume of material small-scale miners often work with. Without taking such (cultural) beliefs into account, it will be impossible to change the routines of the miners.

Current public policies are inadequate to deal with small-scale gold mining in the Amazon countries under study. Small-scale gold mining is often considered illegal and informal, because national mining laws have no regulations for the artisanal and small operators in the business or fail to implement them. As a consequence, small-scale gold miners often lack legal rights and have to work and live in a situation of legal insecurity, that turns into a situation of social and

economic insecurity when they do not have titles to their mining areas. In the absence of functioning national regulations, customary laws or ‘miners’ law’ takes over, such as the agreements between traditional communities and migrant miners, but these might be overruled by national legislation anytime (De Theije et al. 2013). In situations of such insecurity, it is likely that the miners will not make long term investments in the gold fields. Small-scale gold miners are mobile and the communities they form are unstable. This is the complex situation of a sector where many poor people find a living, but that remains informal and is taking place in remote parts of most countries. National governments of Suriname, Peru, Colombia, Brazil and Bolivia, all encounter difficulties regulating small-scale gold mining activities within their borders.

Our comparison considers the existing (or not) legal frameworks of all countries and the way (or not) they are put into practice in the different countries. For example, in the case of Brazil there is an elaborated set of Federal and State laws and regulations on small-scale gold mining, but at the same time, miners also developed a sophisticated customary law. For example, the social consensus that the property rights on land and the mineral resource it holds, belongs to the miner who has first discovered the gold deposit and started its exploration (Cleary 1990: 61). Studying the interplay between these legal systems helps us to understand how mining cultures and efforts of authorities to manage small-scale mining, work out in practice.

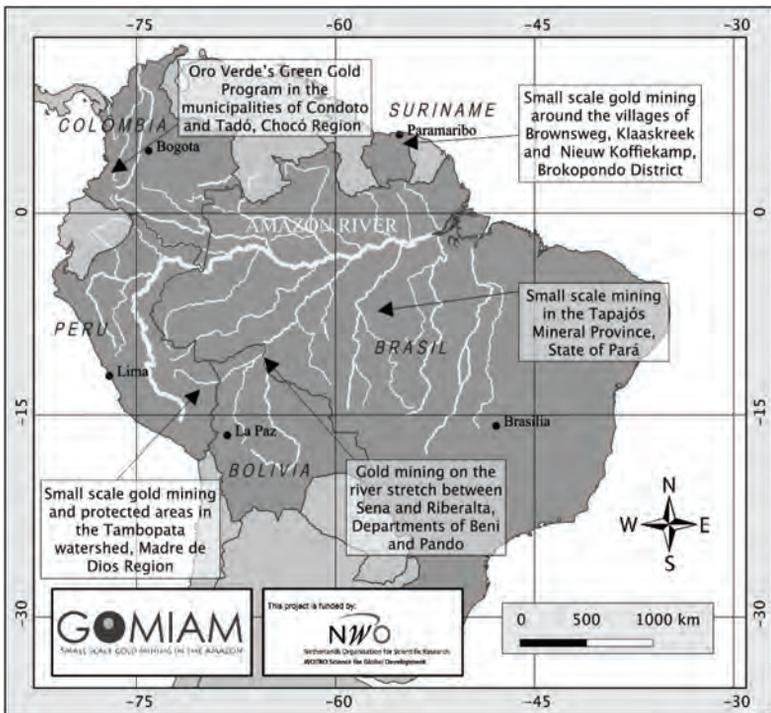
Cross boundary gold mining in the Amazon

The comparative approach of the GOMIAM project is also important because small-scale gold mining is a cross border phenomenon. The mineral deposits are not hindered nor contained by the political frontiers between nations, and in many cases the same goes for the miners. As the gold fields are often located far away from the national power centers, in peripheral, densely forested and poorly accessible regions of the country, there is little border control to register the movements of persons and goods. Many small-scale miners in the Amazon are migrant miners. In Peru, the small-scale gold miners in the lowlands are all but few, migrants from the Andes region and in Colombia the Afro-Colombian artisanal miners in the Chocó have to compete with miners in their territory who come from other ethnic groups and elsewhere in the country. Proof of the fact that miners in the Amazon also cross national borders, is Suriname, where an estimated 75 percent of the miners are Brazilian (De Theije and Bal 2010).

Infrastructural works towards economic integration in the Amazonian region contribute to the mobility of miners. The Brazilian

miners going to Surinam used to cross the border by land, but nowadays just take the plane from Belem to Paramaribo (De Theije and Heemskerk 2009). The construction of the Inter Oceanic Highway, which connects Peru and Brazil by land, made the remote Peruvian Madre de Dios region more accessible. This has consequences for the mining activity taking place in the area, with a significant rise of the number of mines along the highway. At the same time, there have also been more control and interventions from the Peruvian government, trying to control the activity that is partly taking place in a protected National Park area. As mining takes place in and along trans boundary rivers in the Amazon, the problems of pollution, with mercury and sediments for example, go across borders as well.

Figure 2. Amazon region indicating the GOMIAM countries and the location of GOMIAM case studies



Map made by B. Peregovich 2012.

The presence of borders creates a lot of movement of goods and people between countries, some of it legal, but often also illegal. Mercury and gasoline is purchased at lower prices across borders and taken to the gold mining areas, and the mined gold is sold in places with the highest price. Of course, this smuggled gold leaves the country without paying taxes. This way, national borders also create economic opportunities that have to be taken into account for the development

of policies for small-scale gold mining in the Amazon (De Theije forthcoming 2013). Therefore, it is important to look at the small-scale gold mining activity from a regional perspective, instead of just a national one.

Research on small-scale gold mining in five Amazonian countries

The five chapters that follow give a more detailed situation analysis of small-scale gold mining in five countries in the wider Amazon region. They result from baseline studies of the GOMIAM project, carried out in 2011 and 2012. Each chapter describes the socio-political and environmental situation of small-scale gold mining. The descriptions are ample and include the technical, economic, legal, historical, and policy aspects of the small-scale gold mining sector.

In chapter 2, we start with Bolivia, where the case study of the miners of the cooperative ASOBAL is discussed. This cooperative works on *balsas* and *dragas* on the Bolivian Madre de Dios river in the Northern Amazon region. Bolivian small-scale miners are principally organized in cooperatives, which makes their case stand out from the other countries. Recently, the Bolivian government started to develop attempts to exert more control on the mining activities by installing a national institute (EBO) as the only legal buyer of the gold from the miners.

In chapter 3, we review Brazil, which probably has the most elaborated set of formal policies and regulations for small-scale gold mining of the five countries under study. At the same time, due to its long tradition of small-scale gold mining, the informal miners' law is also widely accepted in Brazil. This regulatory system continues to organize large parts of social life between miners, as many still work without environmental and mining permits.

In Colombia, presented in chapter 4, the national conflict between FARC guerrilla, paramilitaries and the government appears to be closely linked to the gold mining in the Chocó region. Although the artisanal local miners have legal rights to their mining grounds, their position is contested by migrant miners, among which the FARC and paramilitary, who possess heavy equipment and the political and financial ability to influence local authorities to control the territory.

In Peru, reviewed in chapter 5, we look at small-scale mining in the Madre de Dios region, which takes place in a national arena that favors large-scale mining enterprises and in a regional area of high biodiversity and conservation initiatives. This makes the uncontrolled small-scale mining a highly contested activity. The chapter describes how there have been violent clashes between government troops and

miners in both 2011 and 2012, which resulted in measures aiming at an improvement of the situation by establishing a ‘mining corridor’.

In the final country chapter 6, the situation in Suriname is discussed. Here small-scale mining has boomed since the mid-1990s. In Surinam, small-scale gold mining is of utmost importance to the national economy and it plays an important role in social and political life. Since 2011, the Government of Suriname is interfering in the small-scale mining sector by registering miners and regulating licenses and taxation. In May 2012 however, the situation made it to the media headlines when thousands of small-scale miners were expelled from a National Park where they had been mining with consent from the park director.

Notes

- ¹ See <http://www.gomiam.org> and the funding programme and agency Co-CooN/NWO http://www.nwo.nl/nwohome.nsf/pages/NWOA_78VD3R_Eng.
- ² El Espectador Colombia 11-05-2012, El Comercio Peru 20-09-2012, Van der Waals in Vrij Nederland 14-01-2012, ILO TV 2010, Video The Real Price of Gold: Child Labour in Small-Scale Mining.
- ³ The average mobile phone contains about 24 mg of gold (Kaushal and Nema 2012:1)
- ⁴ 3,800 vs. 2,600 tonnes/year, see www.galmarley.com.
- ⁵ The development of urban mining is interesting in this context. See: www.urbanmining.org

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COOPERATIVE ORGANIZATION AND Balsa MINING IN BOLIVIA

TON SALMAN, FELIX CARILLO AND CAROLA SORUCO

Introduction

Mining has always been important in Bolivia and remains a key sector of the Bolivian economy up to this day (Espinoza 2010: 117-123). In specific gold mining is old too in Bolivia. The Spaniards already loved the country for it (ibid.: 29-30). Also before colonial times, in many regions of the country, gold was mined with rudimentary techniques. Traditionally, most gold mining took place in the highlands, where small and medium-scale mining was practiced and today still predominates. In the lowlands, it has for a long time been a micro-activity, involving families living near the rivers working on it during their 'spare days'. During the last ten years, and especially during the last three years, small-scale, but also medium-scale alluvial gold mining boomed in Bolivia. In particular the departments of Pando, Beni and Santa Cruz saw increased activity of medium-scale mining. There is no large-scale gold mining in Bolivia.

Some of the gold mining in the northern low lands of Bolivia is done by medium-scale private companies, some by informal, artisanal and small-scale mining groups, and the rest by cooperatives. The cooperatives generally use somewhat more sophisticated technologies, like balsas or pontoons with fully equipped extraction systems on board, but are still considered as small-scale miners. They have become more predominant today than the more informal, temporary, ad hoc, low-tech, illegal and volatile mining that is still taking place in the area. Initially only locals worked in mining, but over the years more and more miners have migrated from other regions of the

country, in particular those who already had some experience in gold mining and gold merchants.

Although Bolivia has a long and rich history of mining, it was never a large quantity gold producer at world level. From the 1960s, gold production increased, mainly due to the presence of medium-scale transnational enterprises, and it continued to grow further to reach high production levels (of sometimes over 14 tons in the mid-1990s, see Hentschel, Roque and Taucer 2003: 4), placing gold among Bolivia's five most important export minerals. Since then, production decreased. In general, the volume of production of the medium-scale mining keeps pace with the export figures. For the small-scale mining this is quite different: in 2008 and 2009 respectively, small-scale mining gold production is believed to have been 3.34 and 3.55 tons. But in these two subsequent years only 3 and 9 kilos were officially exported (Espinoza 2010). This suggests that most of the small-scale gold production was smuggled out of the country. All in all, official figures are not fully reliable, neither on total production, nor on the results from medium and small-scale (partly informal and unregistered) gold mining in the country.

Table 1. Gold production in Bolivia between 2002-2010

Year	Medium scale mining (Kg)	Small-scale mining (Kg)	Total gold production (Kg)
2002	9,080	2,220	11,300
2003	6,290	3,200	9,490
2004	2,580	4,340	6,920
2005	5,360	2,500	7,860
2006	6,570	3,110	9,680
2007	5,570	3,270	8,840
2008	5,070	3,340	8,410
2009	3,720	3,550	7,270
2010	2,410	4,500	6,910

Source: Ministerio de Minería y Medio Ambiente 2010.

As can be observed from table 1, in spite of the significant rise of the gold price, gold production in Bolivia has declined. This is mainly due to the fact that mines owned by medium-scale mining companies are depleted and no new projects have been developed. In contrast, production of small-scale mining, meaning the cooperatives and informal individual mining, is growing and has more than doubled in the past decade.

The GOMIAM case study site in Bolivia is located at the Madre de Dios River in the north of the country. Gold mining in the Madre de Dios region is both typical and special. It is typical in a sense that it demonstrates the increased interest in – and activities developed around – the search for gold in Bolivia. It is also a good example of

the tensions small-scale gold mining produces, because of its threats to the environment and to the local population. Besides, it shows the dynamic situation with regard to the national mining context in Bolivia: new legislation, new criteria, new entities in the process of taking shape and being implemented. At the same time, these new structures are still incapable of really, in a systematic way, changing the mining landscape.

There are also several special characteristics of gold mining in Amazonian Bolivia. First, there is the cooperative structure of the mining organizations (Michard 2008), a form very typical to Bolivia, which is becoming more important in the mining field, as will be explained in more detail in the following section. Second, its predominant small-scale character, different from company-type mining, but also different from the artisanal family or clan-based mining. Third, the mining activity is in the phase of becoming formalized, a process entailing legal, environmental and commercial aspects. Fourth, the fact that at least a proportion of the miners does it only for one part of the year. In other seasons, they practice agriculture, or Amazon-nut-gathering, or return to their places of origin in other regions of the country.

These typical and specific features of the gold mining on the Bolivian Madre de Dios river are subject of this chapter and will be discussed in future publications. In this chapter we will focus on a first introduction. First, we address the history, geology and techniques of gold mining in northern Bolivia. Then we go into the cooperative mining organizations and the form of state control respectively. In the last section, we identify the main conflicts around the gold mining activities in this region.

Small-scale gold mining in the Bolivian Amazon

Geographically, the Madre de Dios is a river belonging to the drainage network of the Amazon watershed. The river originates in Peru and ends after traversing the Bolivian Northern Amazon, where it comes together with the Beni River near Riberalta, to continue as the Madera River flowing into Brazil. Therefore, it is an 'international' river. It has a length of 665 kilometers in the southeast of Peru and 595 kilometers in the northeast of Bolivia. Navigation is possible during the rainy season between Puerto Maldonado in Peru and Riberalta in Bolivia, from where boats can navigate all the way to the mouth of the Amazon river, in the north east of Brazil. The part of the river between Puerto Heat and Sena is somewhat harder to navigate for larger vessels, especially during the dry season, because of rapids.

In all likelihood, some gold mining has been taking place in and around the river already in pre-Inca eras. Gold was a much appreciat-

ed metal in the Inca Empire. The Inca's however, did not manage to enter into the Amazon. Their empire, the region called Antisuyo, did not reach further than the origins of the Madre de Dios river in Peru. Instead, they mined the Andean part of the Madre de Dios river and never seem to have reached the Amazon part of Bolivia. Nevertheless, the Spanish heard vague stories about a legendary kingdom *el Paititi* that once existed in the interior, lowland forests, east of Cuzco. They believed that ample gold was to be found in the jungle and organized several expeditions. Most of the members of these expeditions never returned and the idea of *Paititi* was abandoned, especially after the Spanish found interesting amounts of gold elsewhere. But as any good legend, the illusion never fully vanished.

During the republican era, the search for the rich mines of the legend never stopped, but most opted for finding gold on the river shore, washing the sand and the shingle. In general, the Bolivian Northern Amazon is a very densely forested and sparsely populated area, and except for some medium towns (like Pando, Riberalta and Guayaramerin) and villages in the area, only few people live in the forests. It is a border region, with both Peru and Brazil very near, and the Bolivian capital of La Paz at a much larger distance, both physically and psychologically. The area therefore shows a number of issues that are characteristic to border regions: isolation, cross-border migration and trade but also illegal trafficking of goods and people. Currently, as economic activities in the region the recollection of Amazon nuts and gold mining stand out. There is also selective tree logging and agriculture. These activities also come with serious problems for the environment. On the shores of the river, there are the Peruvian National Parks of Manú, Bahuaja-Sonene, and the national reserve of Tambopata-Candamo, and in Bolivia we find the national Amazonian wildlife reserve of Manupiri. These parks are becoming more and more important for another economic activity in the region: (eco-) tourism.

Five groups of indigenous peoples live in the lowlands: the Esse Ejja, the Machineri, the Cavineño, the Tacana and the Yaminahua. The relationships between these groups and the miners are quite diverse: from symbiotic through reciprocal through unequally reciprocal to outright hostile.¹ Most people involved in the mining are mestizos and people of indigenous origin from outside the region. The composition of the mining community is mixed, because the activity attracts people from different regions, resulting in a multicultural setting.²

The typical form of gold mining on the river Madre de Dios is with *balsas*. These are pontoons, made out of floaters and wood. The *canaleta* (sluice box in English) and the pumping equipment are placed on this floating platform. Through suction ducts (hoses) with a diameter of 6" and pumps functioning through 4-cylinder diesel

engines, the material containing the gold is sucked up from the riverbed. Every *balsa* has a sluice box of about 4 meters wide, covered with a rug locally known as *cabello de negro*, a fabric capable of collecting the heavier gold containing material. A working session takes about 20 hours. Then the pumps are stopped and the rugs are washed to obtain the concentrate, basically 'black sands' and gold. This is put in a big plastic tub or bowl, in which it is amalgamated with approximately 600 grams of mercury. To do this, sometimes stamping with bare feet, and sometimes shaking equipment (paddles connected to an engine) is used. Subsequently the 'black sands' (containing magnetite, *ilmenita*, *rutila*, *hematitas* and others) are separated from the amalgam, and the latter is taken to a distiller or retort to separate the mercury from the gold.

The balsas need river depths between 2 and 10 meters. This limits the period of the year in which work is possible: basically the work is carried out in April, May and June. In other seasons, heavy rains or the lack of rain makes the work practically impossible. Every *balsa* needs at least two workers to operate. The diesel consumption of the engines, usually of the MWM 260-type, oscillates between 5 to 6 liters per hour. The oil consumption is about 20 to 30 liters a month. The average gold production per day is 7 to 10 grams per *balsa*. The mercury used is obtained in the city of La Paz, at a cost of about 1100 to 1200 Bolivianos per kilogram (approximately 11 or 12 Euro). Investment and operation costs are quite high, and the balsas are only apt for small-scale gold mining in areas with gold that is not too fine.

Figure 1. Balsas on the river Madre de Dios, June 2011



Photograph by F. Carrillo.

Figure 2. Amalgamation by stamping with bare feet next to small sluice box, June 2011



Photograph by F. Carrillo.

Bolivia's mining cooperatives

The Bolivian cooperative sector covers 83 percent (65,890 miners) of the working force in the mining sector as a whole. State mining is good for 7 percent, medium scale companies for another 7 percent, and small-scale mining for 3 percent of the mining labor force. The latter is untrustworthy: nobody knows exactly how many people do informal small-scale mining in Bolivia. Furthermore, cooperatives can also be formed by small-scale miners. The Ministry of Mining and Metallurgy recently informed that the number of registered cooperatives between 2010 and 2011 increased from 800 to 1,000. These new cooperatives are present in the Departments of Santa Cruz, Cochabamba, Oruro, Beni, Pando and Chuquisaca, in areas where traditionally no mining took place. It looks like the increase is due to the rise of prices on the world market of minerals like silver, gold, lead, tin and zinc (La Patria, September 6, 2011). Of all mining cooperatives, approximately 40 percent (about 400) work in gold exploitation (OLAMI 2011). It is clear that cooperatives preserve their importance today (Michard 2008).

A comparison with neighboring countries that also have mining activities learns that Bolivia has the highest percentage of company income taxes (IUE, or *Impuesto a las Utilidades de las Empresas*). Additionally, the new bill for a "Mining Law", currently being designed (early 2012), contemplates an even higher tax level for private

mining, raising the portion of the IUE, and mentions the creation of a new tax on the transfers of dividends (IRD, *Impuesto por Remesas de Dividendos*) for the private sector. This would negatively influence investment in exploration and exploitation in gold in Bolivia. Cooperatives, however, are exempt of paying these taxes (confirmed late 2011 in a new decree). The philosophy behind this policy is that the cooperatives have a social function. Originally, they were the 'escape route' for many thousands of miners that were fired after the state gave up state mining companies. As cooperatives, they obtained concessions to continue mining in the shafts and other locations the state had now given up. Their fate proved to be volatile: for many years, many miners lived in dire poverty. But by finding new veins or after the prices for minerals went up again, they obtained good incomes and often even were able to stop working themselves and instead, hire salaried workers. This happened both in the larger scale, highland mining operations as in lowland mining, including gold mining (Michard 2008). Today, many critics assert that the cooperatives have converted into companies (often the ones who pay the lowest wages...) and that they obey laws and regulations mostly in the breach. Since they are considered to be part of the current government's power base, they are privileged and nobody dares to touch them.

The Bolivian State issues mining concessions, albeit that exactly these practices, established in the 'old' but still valid 1997 mining law, are a bit in limbo at the moment. The routine practice was that a cooperative or mining operator applies for entitlements on the squares or grids he wants to work on to SERGEOTECMIN (National Service of Geology and Mining). SERGEOTECMIN checks if the areas are free, then submits a request to COMIBOL (Bolivian's Mining Corporation) with a project profile, which defines the type of operator and operation. Then the project profile is reviewed by a team of lawyers and the Board, which finally authorizes the contract and signs it for one year. In order to have the mining title, the operator must pay the rental fees for one year and has to comply with other paperwork. All of this is stated in the 1997 Mining Code, articles 126-135 (Infoleyes 1997). The cooperative working on the Madre de Dios, has this concession for a large stretch of the river.

Until 2005, concessions were usually issued to both cooperatives and national and international mining enterprises. After 2005, mining has officially become a state-business again, since natural resources are considered national patrimony. Pre-existing concessions however are respected, albeit that the state, gradually aims at becoming partner in all mining activities. In practice however, old mining titling procedures also continue. In total about 10,000 concessions exist. The Ministry of Mining says that 11 medium-scale companies

are in charge of about 25 mining operations, and that there are about 3,000 small miners with 2,000 operations.

This gives an idea of the dynamism in the small-scale mining sector in Bolivia, of which the cooperatives are part. The influence of this cooperative branch in the current administration is substantial; a Vice-ministry for Cooperative Mining (*Viceministerio de Cooperativas Mineras*) was created recently to attend their interests (Estado Plurinacional de Bolivia 2012). Moreover, the small-scale mining sector and the cooperatives in particular obliged the government to acknowledge the sector, and new ways are being designed to include the sector in the national economy on a formal basis.

Nevertheless, the topic of the benefits and the costs of this mining sector remains a controversial one. Generally, the balance is considered a positive one in terms of its contribution to development processes in the regions where the activity takes place. However, some critics assert that the cooperatives have converted into companies, who do not always obey the laws and regulations and do not provide adequate benefits and security to its members. Moreover, its contribution to taxes is low, and in terms of adequate protection of the environment and the assurance of decent labor conditions, the sector's image is controversial (Bocangel, Leytón and Ocampo 2009: 6, Peláez 2009: 27).

In the GOMIAM research area, there is one cooperative, called ASOBAL, with 240 members, settled in the town of Riberalta, in the Beni Department. Its origin dates from a couple of years ago, but the formalization process was sped up by new policies and measures of the current administration, aiming at formalization and more environmental consideration of gold mining in the region. This will be dealt with in more detail in the next paragraph. The aims of the cooperative are several: members (owners of the balsas, locally known as *socios*) can support one another technically, socially and possibly even financially. Additionally, they have a stronger position in negotiations with the authorities. Finally, they are in a far better position to arrange all sorts of legal and bureaucratic affairs, and having done that, they can work without worries or uncertainties (*“trabajar tranquilo”*). On the other hand, the *socios* assume obligations and responsibilities: working ‘clean’, selling their gold to the indicated entity, and complying with the cooperative rules.

ASOBAL is one of the cooperatives that in recent years joined the national federation of cooperatives, FENCOMIN. However, it seems that ASOBAL does not play a prominent role in current power play by FENCOMIN. ASOBAL in general complies with the rules, and attempts to live up to environmental regulations. The reason, as some of ASOBAL's leaders state, is that they are not too sure about their concessions. They fear that the profitable work they do, draws the attention of others, some of whom might have better relationship

in COMIBOL's leading circles. They, therefore, do not want to give any excuse whatsoever to COMIBOL or others to question the legitimacy of their concessions. Hence, they try to do their utmost to obey all the rules.

ASOBAL's organization comprises three key members: the president, secretary and treasurer. They insist amongst their members upon strict compliance with the rules, and check this. Rules are that the balsas are no-go-places for women (except for the cooks), that waste is collected instead of thrown overboard, that safety measures are obeyed, that mercury is used in closed-circuit mechanisms, and that all the gold is sold to EBO, the Bolivian Gold Company (*Empresa Boliviana del Oro*). Obviously, not everything works the way the ASOBAL directory would want it. And ASOBAL itself has in the past years been increasingly displeased with EBO, because this entity often delays payment or operates ineffectively. More information on EBO is provided below.

Owners or *socios* come from all over the country and so do the workers. The *socios* will visit, and sometimes work on the *balsas*. They, and their families, mainly live in Riberalta. The monitoring of the work is left to their administrators: they monitor the daily work, collect the gold, make sure that necessary repairs are carried out, and that the gold is transported to the *socios*. The work on the *balsas* is done by *porcentajistas*, often young men, who have their families in Riberalta or Sena. They work during the week and return home in the weekends. They get a percentage-share of the gold production. On board of the balsas, there might be family members of the *socios* or *porcentajistas*, but mostly, only the cooks are the additional crew. The balsas have small kitchens, and are provided by taking food from Riberalta or by small 'shop-boats' passing by. On the balsas life is hard: working hours are long, the diet is far from varied, the sanitary conditions are poor, and drinking water comes from the river, usable (if at all) only after boiling it.

State control

The Bolivian Northern Amazon region has for long remained isolated and was out of scope and control of the national government. Gold mining in the frontier region was informal and always stood in close contact with the gold mining activities in Peru and Brazil.

In March 1997 the Mining Code (Law 1777) was promulgated and in July of that year the Environmental Regulation for Mining Activities (ERMA) came into being. The first one is currently being modified and the expected result is the new Mining Law to be enacted soon by the Bolivian Congress. It looks like the new bill talks about taking away concessions from mining companies that "do not fulfill

a social function”, but that it will not touch concessions held by cooperatives. Allegedly, it explicitly states that communities on whose land the mining takes place are now entitled to royalties. This, however, is still under debate: the idea is to avoid that communities or municipalities who were so ‘lucky’ to have mining activities on their territory will have everything. An example is the San Cristobal Mine in southern Potosí: should a small town like San Cristobal really have all the benefits, and its neighbors nothing?

Specifically with regard to gold mining there is hardly or no regulation in the ERMA law. In the new bill, apparently, some changes in this respect are underway. The new bill, according to declaration by president Evo Morales, aims at giving new incentives to the 50,000 miners organized in cooperatives. It is, he stated, “the first time that these cooperatives are now acknowledged, even in the constitution, which makes it necessary to adapt norms and concepts in the bill. After all, this is the largest mining sector”.

There is fear in the country that the new law will turn out not to be a good one. Pressures from the cooperatives are likely to weaken environmental and working conditions stipulations and protections. Fear to frighten foreign investment will also weaken employees’ negotiation power and simultaneously result in ‘negotiable’ environmental measures. In other words, a sovereign governmental position is lacking, because interests groups in favor of a flawed law are government supporters. In all likelihood, principles like ‘natural resources exploitation is to benefit all Bolivians’ and ‘all mining activity is to be rigidly regulated and controlled to protect *Pachamama* (Mother Earth)’ will be sacrificed.

In 1992, Bolivia promulgated the Environmental Law (Law N° 1333) that included provisions in order to protect and prevent impacts to the air and water quality, regulated waste handling, soil contamination, forest management and environmental impact. This Law was extended in 1995 with six Regulations for Environmental Management, Control and Environmental Prevention, Atmospheric contamination, Hydric contamination, for activities with Hazardous Materials and for handling Solid Residues. But in practice, there is still a lot to be done, as shown by various impacts of current gold mining on the physical and social surroundings of the mining sites, such as the change of river courses, deterioration of water quality, mercury contamination, heavy metals, cyanide, fine solids, acid waters, lubricants, sewerage waters, etc.

Recently two institutes were created to establish more control: EBO and ADEMAF. The Bolivian Gold Company EBO was created by COMIBOL in March 2011 (Oro y Finanzas 2010). Its task is to control the national production, through buying all the gold from the cooperative sector and store it in the National Bank of Bolivia. An additional tax on the gold sales should generate more income to the re-

gion where the gold is produced. EBO initiated this process in early 2011 in its first office in Riberalta.

A government entity called ADEMAF, *Agencia para el Desarrollo de Macrorregiones y Zonas Fronterizas*, was created in 2010, and has a role in giving the Bolivian State more control in the region.³ ADEMAF has a mandate to instruct the military and the navy to control the rivers, the borders, and the inlands, to search for illegal practices and to detain the ones involved in it. Additionally, ADEMAF arranges ‘ambulant’ visits for health and civil registering services, thus strengthening the state presence in the region with both stick and carrot strategies.

Another effect of current national Bolivian policies is that the international character of the mining in the region diminished: foreign owners of balsas have been expropriated, and their presence was ‘discouraged’. As a result, most miners in Bolivia and in particular in the Madre de Dios region today are Bolivian.

Gold related conflicts in the Bolivian Amazon

Bolivia, like other countries in the region, has witnessed an upsurge in mining activity in general, and in gold mining in particular, in the last 15 years. As the other Amazon countries (as well as beyond those), in the wake of this upsurge, social, migration, and political reactions followed. The struggle for access to promising mining sites intensified. Sometimes indigenous communities and peoples became, often reluctantly, part of this new power game. Pressure on indigenous territories increased significantly. Sometimes new tensions arose between already established and new private and formalized mining activities, and ‘squatters’ or informal miners penetrated areas they thought secured. Oftentimes, new conglomerations of miners surfaced gathering on promising sites, but coming from different backgrounds, regions or even countries.

In many cases, rumors about successful miners trigger new migration flows, unsettle communities, launch people into risk-taking and result in tensions, upheaval, bitter poverty and – scarcely – some success. Additionally, new players will enter the mining business. According to a recent study in the department of La Paz (Gozálvez et al. 2012), the number of people involved in mining increased with 300 percent in the last 12 years. This, in turn, brings on enormous challenges for existing infrastructure and transport facilities. Also miners amongst themselves fight over access to working places, a problem largely solved through ASOBOL now having 10 concessions. But some inland communities dislike the presence of the balsas, although most people appreciate the employment, the money, and the concomitant local (economic and other) dynamics.

Conflicts occur between those miners who are still ‘informal’ and receive pressure from the cooperative ASOBAL and their members. Once formalized, the *balsa* owners have to comply with the rules set by ADEMAF and EBO, concerning environmental protection, safety measures and commercialization procedures. Mostly they want to comply, to be able to ‘work without worries’, but if there are other miners who are still dodging the law, for example in relation to the tight control on fuel sales, this creates tensions.

The most complicated dimension might be that of politics. Political administrations face different challenges simultaneously. To begin with, they might have electoral support in those sectors involved in mining, and will not want to risk losing that. Next, they will want to regulate and control the increased mining activities, to mitigate as much as possible environmental damage, illegality, and smuggling. Thirdly, they might be obliged to be arbiter in conflicts that arise between landowners, informal miners, formal companies, salaried miners, indigenous communities, farmers and others. Fourthly, they will want their share of the bounty, and will try to impose taxes, royalties (*regalías*), and fees for permits and concessions. Often, their capacity to deliver and/or impose themselves on all four fronts will be limited. Political administrations compete with each other too. In the Bolivian Amazon there are tensions between the Departments of Beni and Pando: both Pando-authorities and the communities in Pando demand the revenues of gold-searching in their department, but since most governmental activity is organized from Riberalta in the Beni Department, revenues are largely concentrated there. This is of course also embedded in the general context of long lasting political division between Bolivia’s ‘half-moon’ (lowland) departments and the National Government in La Paz, who continue to have very different views on the development of their country.

Conclusion

In Bolivia the gold mining takes place both in highland and in lowland settings. Conditions, success and state presence are quite different in these various settings. Gold mining is diverse in the country in terms of the scale of the mining activity, the degree of formalization, the taxing regime, and this peculiar Bolivian phenomenon: cooperatives. Mining employment in the country is for 84 percent provided by the cooperatives, a fact that in combination with their political proximity to the incumbent government in Bolivia, gives them substantial influence in the country.

In our case study, the ASOBAL cooperative, some specific features were highlighted. It is a case of small-scale gold mining, in which the cooperative plays the key role for organizing and regulat-

ing the activity. The relationship between ASOBAL and the authorities seems to be one of “on speaking terms”, albeit that the government seems to take, in general, the initiative to get in contact. The mining on the Madre de Dios river is an illustration of the gold mining expansion on the continent, that attracted people from elsewhere, and that has significant impacts at the social, migration and political level. However, what makes it special and worthwhile to study into more depth, is the way in which it tries to comply with state regulation. In the midst of confusion and unpredictability in mining legislation and effective regulation in the country, this is an interesting development. Further study will have to indicate whether in this case it is possible to walk the road of negotiation, regulation, formalization with (degrees of) consent from different parties and come to environmentally and socially more sound ways of gold mining. The process will have its setbacks and dilemmas in the future, and it is, obviously, too early to call – anything. But it seems more than worthwhile to follow future events meticulously.

Notes

- ¹ Some confusion about the status of these peoples exists: sometimes people from outside mixed with or started living near *originarios*, and began to call themselves *campesinos*, a term that in Bolivia is sometimes considered synonymous for ‘indigenous’ or *originario*.
- ² But no longer multinational, since recent measures by the Bolivian government (2011) demotivated most foreign, especially Peruvian and Brazilian, miners’ presence in the region. This will be explained into more detail in the following part of the text.
- ³ See <http://www.fmbolivia.com.bo/noticia29047-ademaf-revertira-debil-presencia-del-estado-en-fronteras-y-mitigara-males-que-afectan-a-esas-zonas.html>.

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FORMALIZED SMALL-SCALE GOLD MINING IN THE BRAZILIAN AMAZON: AN ACTIVITY SURROUNDED BY INFORMALITY

JUDITH KOLEN, MARJO DE THEIJE AND ARMIN MATHIS

Introduction

Brazil is the twelfth largest producer of gold in the world, with a production of 58 tons in 2010 (IBRAM 2011). Most of this gold is produced by large mining companies such as the South African *AngloGold Ashanti* and the Canadian *Yamana Gold* and *Jaguar Mining*. According to the Brazilian Mining Association, 12 percent of all the gold mined in Brazil is produced by *garimpeiros*, or small-scale miners (IBRAM 2011). However, the actual gold production figures of small-scale miners in Brazil are believed to be much higher. 2009 Estimates were of 500,000 *garimpeiros* working in gold and gemstone mining (CASM 2009) but the increasing price of gold since then brought new workers to the sector.

In Brazil, small-scale mining is addressed in the Constitution as a form of mineral exploitation. It is formalized as an economic activity for which people can obtain a license. Nevertheless, many miners continue to work illegally, without a license, without paying tax, and ignoring rules and regulations for nature conservation.

This chapter deals with small-scale gold mining in the Brazilian Amazon in general, with specific information on Tapajós Province in the Southwest of the State of Pará. With its 100,000 km² it is the largest small-scale gold mining area in the world, and the most important gold producing area in Brazil (Villas-Bôas 2003: 1).

History of gold mining in the Brazilian Amazon

In the letter of Pêro Vaz de Caminha on the discovery of Brazil, written in 1500, the presence of gold in Brazil is already mentioned. Partly due to the search for gold in colonial times the Brazilian borders were pushed deep into South America (Cleary 1990: 1). Commercial exploitation only began after 1693, when the first large gold deposit was discovered in Minas Gerais, followed in the early eighteenth century by Mato Grosso and Goiás. At the beginning of the eighteenth century Brazil had become the largest gold producer in the world. However, the rich alluvial deposits soon were exhausted and production declined from the middle of the eighteenth century (Hanai 1998: 1).

In 1958, one of the world's most important gold deposits was discovered in Tapajós, a region with a centuries-long history of extractive exploitation of forest products, including natural rubber. It marked the start of small-scale gold mining in the Brazilian Amazon. Many people migrated to the area, where the exploitation began in areas of high natural productivity, with rudimentary equipment. Tapajós became the main gold producer in Brazil. After a decade however, all the alluvial deposits close to the surface were worked out without any modifications to the manual extraction techniques. Productivity started to fall and it appeared that small-scale mining in the region would come to a hold.

Three external factors ensured that this crisis could be overcome rather quickly. First, the gold price started rising significantly since 1971 and saw an unprecedented price explosion in 1979. Even with lower productivity the monetary value of the production output in gold mining tripled. Secondly, through the construction of the Trans-Amazon Highway and the Santarém-Cuiabá Highway, the municipality of Itaituba in the Tapajós province became connected to the financial and commercial markets in the south of Brazil. Itaituba soon became the commercial center in the gold-bearing province. At the same time the implementation of the national colonization program in the region led to increased state presence and a strong migration to the region took place (Mathis 1995: 5). Many of these migrants were landless people from the northeast; others were entrepreneurs with capital to invest in small-scale mining businesses. The arrival of these entrepreneurs, who had the capital to purchase motorized suction pumps and crushers, accelerated the mechanization of the small-scale mining process. With this new equipment it became possible to mine in areas that had previously not been profitable to mine. An important innovation was the introduction of the *balsas de mergulho*: mining rafts in the rivers with a diver, motorized suction pumps, high pressure hoses and sluice boxes. This type of mechanization of the mining process made it possible to work depos-

its that up to that time were not accessible to the miners. The exploitation expanded to deep alluvial deposits on the riverbanks and into the rivers.

The high price of gold on the international market in 1979 sparked off a real Gold Rush in the Brazilian Amazon. Gold mining became the most important economic activity in the region. It has been estimated that the number of people working directly in the small-scale gold mining sector in the first half of the 1980s counted between 300,000 and 500,000 (Larreta 2002: 12). The new techniques that had gradually been introduced in the previous decade now became standard in the exploitation of alluvial gold mines. New rich reserves became reachable and the individual gold production increased. Profits were so high that the shift to mechanization became possible for many small-scale miners, without needing capital from outside of the mining sector.

The gold rush became most prominent in Serra Pelada, in the southeast of the State Pará. The movements were widely covered on national and international television and the Serra Pelada case became a symbol of the Amazon gold rush (Larreta 2002, Cleary 1990). In 1979 gold was first discovered here on the land of a small farmer. Although the owner of the ranch tried to keep the discovery a secret, news spread quickly and caused many people to come to the area to start mining.¹ While impossible to stop the influx of people, the cattleman became the owner (*dono*) of the gold rush, and constructed an airstrip, assigned mining sites to newcomers and provided facilities. It soon became clear that it was a very rich gold mining site indeed, as many small-scale miners found a fortune there. This attracted even greater number of miners, and by 1983 some 100,000 *garimpeiros* were believed to work in the world's largest open pit gold mine (Larreta 2002: 14).

The activities in Serra Pelada were watched closely by the Federal government. The large number of people gathering in such a small place was seen as a threat to national security. For this reason the federal authorities took over Serra Pelada in May 1980 (Cleary 1990). Yet, government efforts to mechanize the mining operations were successfully resisted by the miners, and they became a powerful political force in the region. Serra Pelada remained a location where small-scale miners could search for gold, but with the benefits of government facilities such as a free clinic and malaria control post. Serra Pelada was eventually closed for small-scale miners by the government, but by that time the deposits exploitable by *garimpeiros* were largely exhausted. As Cleary (1990: 185) explains, this example of state interference in small-scale gold mining has been rather unique in Brazilian history of *garimpagem* and did not result in a new relationship between small-scale mining and the state. The actions of the government were not seen as part of a mining policy, but

as a policing action (Schmink and Wood 1992: 243). In most of the Amazon around this time, state activities regarding small-scale mining were confined to the delimitation of territories designated to small-scale miners, where non-industrial mining was allowed without prior admission or license. In 1983 for example, the small-scale mining reserve of Tapajós was created, which covers an area of 28,745 km² (Decree 882 Jul/28/1983).

The boom in small-scale gold mining lasted not more than ten years. The rise in gold production that characterized the 1980s, was followed by a decline of almost the same intensity in the 1990s (Cleary 2000: 61). The main reason for this decline has been the exhaustion of alluvial gold deposits in Tapajós. At the same time political decisions of the Brazilian Federal Government intensified the problems for the small-scale mining sector. First, an economic measure introduced in 1990 by President Collor subverted the domestic price of gold and at the same raised time the price of the production inputs. Second, the Federal Government banned all mining activities in indigenous areas, especially in the area of the Yanomami reserve in the Northern Amazon (especially Roraima), where between 1987 and 1990 nearly 40,000 miners had worked. Many small-scale gold miners left for neighboring countries such as Suriname and French Guyana to try their fortune there. It was estimated that around the turn of the century merely some 20,000 small-scale gold miners were working in Brazil, and that there were some 10,000 to 20,000 Brazilian *garimpeiros* working in neighboring Amazonian countries, notably Suriname and Venezuela (Cleary 2000: 62).

The recent rise in price of gold has resulted in a renewed interest in small-scale gold mining in the Brazilian Amazon. Areas that had been declared exhausted in the past, turn out to be profitable to process again. The estimated number of *garimpeiros* has risen again to 200,000 miners in 2010 (Sousa et al. 2011: 742). Some of these miners work legally, but many more continue to work without the necessary licenses, ignoring environmental regulations.

The legal framework for small-scale mining in Brazil

Of all Amazonian countries, Brazil has the most elaborated set of laws and regulations regarding small-scale gold mining. The Mining Code of 1967 creates the criteria for interested parties to claim mineral rights, and defines concepts related to mining such as rights of land owners and areas available for mining (Freire et al. 2008). All mineral deposits are defined as an asset of the Union, who grants licenses for exploration and exploitation. In the Code, small-scale mining is recognized as a form of mining and described as: (1) a rudimentary form of mineral extraction, (2) executed on a deposit of a

specific nature (i.e. alluvial), (3) by individuals working on their own account. These characteristics do not bear much relation to past or present reality. For in the eyes of the law the use of small machinery, as well as working in small teams, does not fit the profile of the *garimpeiro*. This made future policy making complicated.

Nonetheless, many laws and regulations directly concerning or affecting small-scale mining efforts have since been developed. To start with, there is a 1989 law that created the mining permit for small-scale mining activities, issued by the DNPM (National Department of Mineral Production) to either Brazilian citizens on an individual basis, or to associations constituted as a mining company. The permitted area for individuals is restricted to 50 hectares; there are no restrictions for associations. Operating without a proper license is considered a crime subjected to a maximum of three years imprisonment and a fine.

The holder of a mining license is held responsible for the environmental damage caused by the mining activity. As a precondition for a mining license therefore, it is mandatory to obtain an environmental license. This is not an easy task as it requires a lot of paper work: environmental impact assessments, maps, mineral exploration reports, and many more documents are needed. Not only is it very expensive, but most miners are not even familiar with the requirements. Things are complicated further by a very slow bureaucratic handling of the applications. According to Sousa et al. (2011: 746) 29,888 small-scale miners permits had been requested all over Brazil and only 106 had been approved by the DNPM in 2008. The rest of these applications had been accumulated in the office.²

June 2008 saw the passing of law 11.685, known as the “Statute of *Garimpeiro*” (Sousa et al. 2011: 745). It modified the legal definition of artisanal mining in several ways. It abandoned the traditional definition of the small-scale miner as a self-employed individual and instead recognized a diversity of working regimes alongside autonomous individual labor, such as the family-based working unit, individual worker in an established labor relationship, working in partnership, and mining in an associative form such as a cooperative. The Statute requires that artisanal miners recuperate the area they degrade by mining activities, and that they comply with the existing legislation regarding occupational safety and health. Miners who can prove that their gold was mined in an area with a legal mining title, are allowed to sell their production directly to a final consumer.³ The Statute also installed the “National Day of the *Garimpeiro*” to be commemorated on June 21, and entitled the seventeenth century *bandeirante* Fernão Dias Paes Leme as patron of the *garimpeiros*, who are the “contemporary *bandeirantes*”⁴ as one senator said (Agência Senado 2008).

43.9 Percent of the Brazilian Amazon, or 2,197,485 km² has the status of Protected Area, as a means of conserving the natural resources in the Amazon (Veríssimo et al. 2011). Half of this land is designated as Conservation Units as either areas of Full Protection or areas of Sustainable Use. Full Protection areas are destined for preservation of biodiversity; Sustainable Use units are destined for both biodiversity conservation and sustainable extraction of natural resources. The other half of the Protected Areas in the Brazilian Amazon region is Indigenous Land. Here Indians have the right to permanent possession and the exclusive use of soils, rivers and lakes in which they exist. In 2006 the Federal Government created seven Conservation Units in the Tapajós Region of which two Units of Full Protection, and five units of Sustainable Use. Many of these units overlap with the small-scale mining reserve of Tapajós, created in 1983 by the Ministry of Mining. Others are located in areas for which mining permits had already been issued, or for which exploration and exploitation requests had been pending approval.

With the creation of these units, all mining activities in these specific areas in Tapajós became illegal.⁵ There are many cases known of people who obtained the necessary mining license before 2006. Their licenses have not been withdrawn however. What's more, new applications are still being processed at the office of DNPM (Ricardo and Rolla 2006). The situation is confusing and causes unrest and insecurity among the small-scale miners in Tapajós. Their activities seem to be tolerated by the mining agencies, but they are constantly under the threat of policing actions of the environmental agencies. Sousa et al. (2011: 743) describe the political impasse as follows: "*The environmental requirements created by the legislation are aimed at harmonizing economic development with environmental protection, but in practice, different power dynamics within the various agencies responsible for mining sector governance and environmental governance lead to differing views on which priorities should command the government's focus*". The small-scale miners feel discouraged to try to understand the plans of authorities and to invest in obtaining the necessary documentation. As a result, the different types of territory seem to mix in practice. We found a sign "FLONA do CREPORI" next to a mining pit.

In February 2011 the Ministry of Mines and Energy presented the 2030 National Mining Plan (PNM-2030). It is one of the steps in building a new institutional framework for mining. In the plan a scenario for the mining sector for the next two decades is elaborated upon with three guidelines: "*(a) effective public governance that promotes the use of nationally extracted mineral assets for national interests; (b) added value and consolidated knowledge in all stages of the mineral industry; (c) sustainability in all stages of the mineral productive chain.*" (PNM-2030: XVII). The development of the new

institutional framework is still an on-going process. Most of the proposals are currently under debate, and different stakeholder groups are lobbying for their interests at the Federal level. It is unclear how the new institutional framework on mining will affect small-scale mining. What is striking, however, is that small-scale mining is not under debate in the public discussion. Only three years after the Statute of the Garimpeiro, there is no mention of small-scale mining in the National Mining Plan. This could be an indication that the Brazilian government is not willing to include small-scale mining in future mineral policy. Will *garimpagem* become a clandestine activity once more?

Life in the Tapajós small-scale gold mining reserve

It proves very difficult to implement and enforce the elaborated set of rules and regulations regarding small-scale gold mining. This does not mean that the Brazilian small-scale mining regions are characterized by chaos. The absence of state presence in past and present has created space for the new social actors in the Brazilian Amazon to self-organize the regulation of society. Many customary laws and regulations exist, together forming what could be called “the law of the *garimpo*”.

One of clearest examples of a local arrangement recognized by all, is the property rights of land and the mineral resource. Tradition has it that whoever discovers gold first at a certain location, becomes the owner, the *dono* of that small-scale gold mining area. The *dono* cannot deny access to the land⁶ for other small-scale miners, but has the liberty to charge usually 10 percent of the gold production (Cleary 1990: 59). These informal land titles and mining titles are recognized and respected, in the sense that they can be bought and sold. In more recent times, some traditional *donos* have also registered their land formally with the National authorities.

Small-scale gold miners are independent workers, who team up with others in small groups in the pits. Owners of machinery and equipment form partnerships (*sociedade*) with workers to exploit the gold deposits. It is an informal agreement in which the worker contributes his labor, and the owner of the equipment contributes the machinery and bears responsibility for the costs involved, such as food for the workers. At the end of the extraction process the final produce of ore is divided between the owners and the group of workers (Mathis 1995: 9). The most common division is 70 percent for the owner of the machinery, to 30 percent for the workers. The workers (usually five in one team) subsequently divide the 30 percent between each other in equal shares. As the work gets more mechanized, the percentage reserved for the workers usually becomes lower. This

change is justified by increasing production costs for the owner of the machines, and is accepted by the workers because of higher physical returns and a rising gold price. Sometimes it is agreed upon that the workers receive a higher percentage of the physical gold production, but that they pay the salary of the cook. It is common practice that the cook and the operator of the excavator receive a monthly wage. Although this working regime is not in accordance with the Brazilian working legislation, it is considered fair by all parties involved and offers advantages to both the worker and owner of the machinery.

Workers usually live in the forest next to the mining pit, where they eat and sleep in hammocks, in simple wooden constructs covered with plastic. In case the mining pit is located in proximity of a *currutela*, a mining village, workers might go and visit every weekend. But usually *garimpeiros* only go there after the gold has been recovered and distributed amongst the crew. The *currutelas* have an important economic and social function. Here the *garimpeiros* sell their gold in gold buying shops, who also serve as a kind of bank where you can save money and make credit transfers. Many people send money home to family members usually living in the poorer states of Brazil. The rest of the money is spent on new cloths, drinks and leisure in the local bars. In addition, the *currutela* is the place where a *garimpeiro* can go and visit a pharmacist, who in the absence of a doctor usually also provides treatments for the easier ailments; it is a place where he can go to church, look for female friendship, and look for a new place to work, if needed.

Currutelas can be seen as settlements erected out of a *garimpo*. Through time people started settling here more permanently, and created other economic activities than working in the mining pit, such as running a bar, a shop or providing transport. Some of these informal settlements in the Tapajós region are in the transition of becoming a formal village, recognized by the authorities. The coming of a deputy mayor could go hand in hand with the construction of a primary school, the setting up of a health post and a police station. But even in these more formal villages, gold mining remains the main source of income, either direct through mining gold, or indirect through the provision of services to the sector. So far, not many livelihood alternatives have been developed in the Brazilian gold mining regions and communities.

Small-scale gold mining methods

Most of the gold extracted by small-scale miners in the Brazilian Amazon comes from the secondary deposits, which usually have been transported by water to places far from the original rocks. Because

the Amazonian rivers constantly change their course, a secondary deposit can be distributed in the entire width of a river valley and be covered by sediment and organic material. Small-scale gold mining, like any production of minerals, involves three different phases during the extraction process: exploration, mining and processing. The exploration methods practiced by small-scale miners are capable of revealing the non-deep secondary deposits only. Primary deposits are usually only discovered by coincidence, during the process of mining secondary deposits. But once a vein is discovered, it is unlikely that it will be left untouched.

Figure 1. The main street of *currutela* Creporizão on a quiet Sunday, Tapajós 2012



Photograph by J. Kolen.

Mining a secondary deposit begins with deforestation and the clearing of the terrain. The thickness of the overburden that must be removed is usually two meters. Underneath the first layer of organic material, sand and clay, there is the auriferous gravel. The bottom of this gravel contains the layer with the most gold. The soil is removed with the force of water generated by an injection pump. The pulp formed by the water and the soil is pumped-up and escorted to either the river in case of overburden or to the wooden sluice box in case of gold-bearing material.

On the rivers the secondary deposits are exploited through the use of *balsas* or *dragas*. On a *balsa*, Portuguese for raft, the river bottom is sucked via hoses manually driven by divers and powered by diesel motors. A *draga* is the same as a *balsa*, except for the fact that the hoses are mechanically driven, and no diver is needed. This production method on the river usually requires a team of three workers: one for handling of the suction hose under water, one to operate and supervise the engine and compressor, and one to supervise the sluice box where he periodically evaluates the content of the mined material and removes larger stones that can disrupt the process. Usually a

cook completes the working team. The *balsa* is highly associated with Tapajós, where its use was pioneered (Cleary 1990: 16). Production proved to be very high and since 1979 the *balsa* has diffused throughout Amazonia. In their cross-Amazonian movement, the Brazilian *garimpeiros* diffuse their mining techniques (cf. Theije and Heemskerk 2009).

Figure 2. Balsa on the Marupá River, Tapajós 2012



Photograph by J. Kolen.

Figure 3. Draga on the Crepurí River, Tapajós 2012



Photograph by J. Kolen.

For mining the primary deposit, alternative techniques are used. As explained above, primary deposits are usually discovered by coincidence during mining of secondary material. That explains the fact that most of the primary gold deposits in the Tapajós region are explored in open-pit mining. After discovering a vein, all the overburden is removed to get access to the vein. The type and the condition of the rock that hosts the vein, define the technique to be applied for the extraction. Most common are the use of water (in case of decom-

posed rocks), hydraulic hammers, tractors or explosives. The broken rock material is stocked outside of the pit. Depending on the size of the mine, this activity is done manually or with help of handcarts, conveyors, elevators, cranes and trucks. In the past years some larger operations, more mid-scale than small-scale, have started working with sophisticated equipment in the mining reserve.

Another form of exploitation of primary deposits is underground mining. This technique is only recently becoming more common in Tapajós, but it has a long tradition in other parts of the Brazilian Amazon. The first step in an underground mine is the opening of a shaft with edge length between one and one and a half meter. The well is dug deeper until a layer of gravel or auriferous mineralized rock is found. When a deposit of gold is found, the miners try to follow the path of the gravel. To do so they dig a horizontal tunnel, called gallery. The mined material is placed in buckets and hoisted with the help of a wooden crane.

Environmental and health issues

In almost all small-scale gold mining regions mercury and cyanide are the most often used metals for the amalgamation of gold, and the Tapajós region does not form an exception to this. In Brazil the use of these metals is forbidden by law for people without previous licensing, but according to Sousa et al. (2011: 743) nearly 100 percent of the small-scale miners use mercury, or sometimes cyanide, without any permit. The use of mercury is problematic in two ways: it results in occupational exposures as well as environmental pollution. Most research on the use of mercury in small-scale gold mining in Brazil has concentrated on either analyses of human contamination, or assessments of pollutant levels in aquatic organisms and related environmental media (Hilson 2006). Examples of these kind of studies include Silbergeld et al. (2002), Berzas et al. (2010) and Crompton et al. (2002). Less research has been done on identifying appropriate policy and educational initiatives for reducing the hazards caused by the use of mercury (Hilson and Vieira 2007).

In this context it is worth mentioning the Global Mercury Project, which was initiated by the United Nations Industrial Development Organization (UNIDO) in 2002 and focused specifically on the concerns of mercury contamination caused by small-scale mining. It was a very ambitious project with objectives such as the introduction of cleaner technologies, training of miners, development of regulatory capacities within national and regional governments, and conducting environmental and health assessments (Global Mercury Project 2012). Brazil was the only Latin American country participating in the project and activities were concentrated in the Tapajós region. As

a result of the project's efforts, the use of retorts has increased from 20.3 percent before intervention to 41.2 percent after intervention in the selected site studies in Tapajós (Sousa et al. 2011: 745). Nonetheless, the use of mercury among small-scale gold miners in the Tapajós remains very high. The project did contribute to the growing awareness amongst researchers that the mercury pollution problem will not be resolved until governments and donor agencies commit to carrying out research aimed at improving understanding of the dynamics of small-scale gold mining activities (Hilson 2006: 14).

Probably the most important environmental consequence of small-scale gold mining is malaria. This parasitic disease is spread easily in the gold mining regions, due to diggings filled with water where mosquitoes breed, poor sanitation and infected miners that move frequently from one region to the other, thus spreading the disease. According to Eisler (2003: 330) about 600,000 cases of malaria are reported in Brazil annually, of which 99 percent occur in the Amazon River Basin. The high mobility of the small-scale gold mining population explains partly why malarial control programs have so far not been very successful in mining regions in Brazil. A comparative study between Suriname and French Guiana shows that local policies are also of major influence on the successfulness of anti-malaria campaigns (Jordan 2010).

Figure 4. Mining camp in the Tapajós, 2012



Photograph by J. Kolen.

Probably the most overlooked health risks in small-scale gold mining are those associated with occupational health and safety. Every day miners are exposed to long working hours in hot and humid conditions, they are working in awkward physical positions, they are exposed to loud and constant noise, they bathe in polluted water, live in unhealthy housing with bad management of excreta and household waste, to name but a few risky conditions to health. On top of this the danger of working in a mining pit or raft can cause injuries to arms,

legs and backs, and fatal accidents are not uncommon.⁷ These dangerous working conditions have not received the same attention by researchers and policy makers as have environmental issues associated with small-scale mining. As long as *garimpagem* remains a sector surrounded by spheres of informality, it is not likely that occupational health and safety will become a topic on the political agenda.

Conclusion

Small-scale gold mining has a very long tradition in the Brazilian Amazon. Here the miners together developed forms of organizing the work and specific informal rules associated with living in the *garimpo*. Different techniques pioneered in the Tapajós region of Brazil can now be found in gold fields all over Amazonia. Brazil, of all Amazonian countries, probably has the most elaborated set of policies and regulations regarding small-scale gold mining. Nonetheless, most small-scale miners continue to work without the necessary environmental and mining permits. Since Brazilian authorities so far have not deployed mechanisms to enforce the application of laws, the “law of the *garimpo*” remains the most important guidance for organizing life in the small-scale gold mining regions of Brazil. As a result, the sector continues to be associated with environmental damage and health risks, while at the same time offering a livelihood alternative for thousands of individuals from the poorer regions of Brazil.

Notes

- ¹ This phenomenon is called *fofoca* in Brazilian small-scale gold mining, which literally means “gossip.” It refers to the excitement provoked by a gold strike, and the word is also used to name the initial phase of the formation of the *garimpo* (cf. Cleary 1990: 51-72).
- ² By July 2012, 282 PLGs had been approved for the Tapajós region.
- ³ The fact that few small-scale miners were able to get a mining license results in a situation where many small-scale miners are in the possession of “illegal” gold. To overcome this situation, a change in existing legislation was proposed in 2009, allowing small-scale miners to sell their gold without a valid mining license. Anno 2012 still no final decision has been taken on the proposal, but it has already been rejected in two internal commissions (may 2012). Recent fieldwork in Tapajós by GOMIAM has showed that the fact that gold is often mined without a mining license does not complicate the selling of the gold: most gold buying shops in the region buy the gold anyway. What is more, the price paid for “illegal” gold is notably higher than the price paid for gold mined in areas with an official license, this is due to the fact that no tax needs to be paid.
- ⁴ Named after the men who made the expeditions to the interior of Brazil, to enslave Amerindians and discover mineral wealth, from the 16th century onwards.

- 5 Mining only continues to be permitted in the Área de Proteção Ambiental (APA) do Tapajós. APA is a type of Sustainable Use Conservation Unit, and stands for Area of Environmental Protection. Almost all the small-scale mining reserve of Tapajós is now covered by the APA – Tapajós. This has created confusion over which agency is going to administer this area, which has up to now been done by the National Department of Mineral Production (DNPM).
- 6 As a contradiction to this informal rule, the past has also seen examples of 'closed garimpos' in the Tapajós region. Here, access was controlled by the owner, who was the only one who explored for gold.
- 7 Almost all miners interviewed by GOMIAM researchers in spring 2012 in Tapajós, had witnessed at least one fatal accident in their career as garimpeiro.

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CHARACTERISTICS AND CHALLENGES OF SMALL-SCALE GOLD MINING IN COLOMBIA

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Introduction

Colombia is a developing country with over 45 million people of which 46 percent lives on less than one dollar per day. Colombia has a fast growing economy and at the same time one of the highest indices of inequality in Latin America (0.56 GINI) (Inter-American Development Bank 2011; CIA 2011; DANE 2009). Approximately 75 percent of the population lives in the major cities and urban centers. Peasant, indigenous and black communities make up the majority of the rural areas, which comprise almost the entire land base (IDEAM 2001). Indigenous and black communities have acquired collective land titles that total forty million hectares.

Despite widespread poverty, Colombia is abundant in natural resources. This is a result of its wide array of climates, locations and topographic features. It is one of the world's 'mega diverse' countries, hosting close to 14 percent of the planet's biodiversity and is also one of the country's richest in water resources (Convention on Biological Diversity 2010). Colombia has good quality soils for agricultural activities, and it is abundant in mineral resources. It has the largest coal reserves in Latin America, next to important gold, platinum, and silver reserves as well as many others (Wacaster 2010).

Colombia's need for economic development and its wealth of natural capital have resulted in a discussion over how to best manage

its renewable and non-renewable natural resources. This happens within a context of violent conflict that has its roots in a historically defined inequality that has lasted for more than forty years (Pardo 2000; Sweig 2002). Today, the conflict has evolved into a dispute over narcotics and natural resource extraction, including mineral resources (The Economist 2011; Romero 2011). These conditions of poverty, abundance of natural resources and violence, frame several of the conflicts surrounding gold mining in Colombia.

Gold mining in Colombia is an important activity, particularly as a source of income in rural areas. However, at national level its significance is not as prevalent, as the manufacturing and agricultural sectors have grown and have become important sectors of the gross domestic product. The departments where gold mining is most prevalent are Chocó, Antioquia, Valle del Cauca, Cauca, Nariño and Bolívar. Especially in the last 10 years, gold mining has regained strength as the international gold price has increased significantly and large companies have reinitiated their activities. These recent trends have uncovered social, environmental and economic conflicts that threaten social stability in many traditional gold mining areas. This chapter describes the historical and contemporary context of gold mining in Colombia, and describes some of the most current conflicts.

History of gold in Colombia

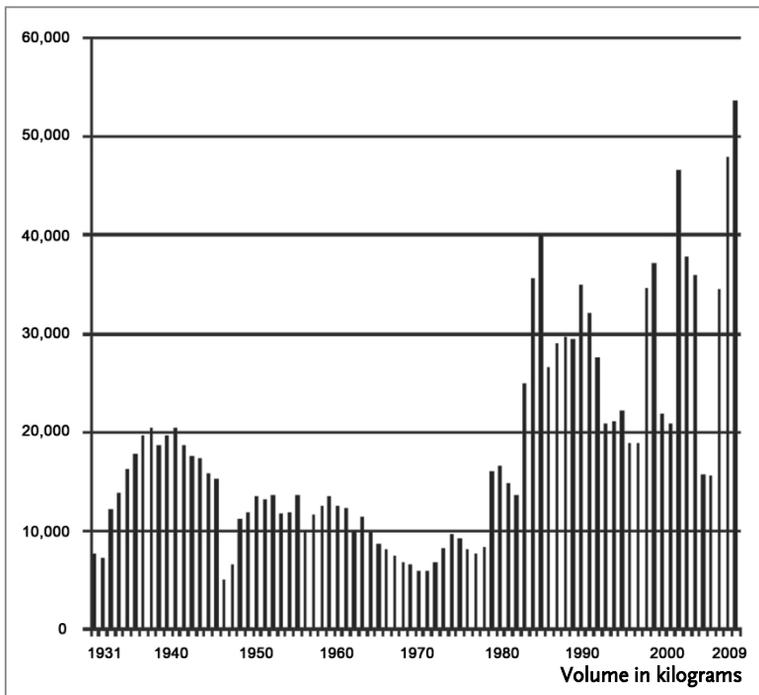
Gold mining in Colombia has been an on-going activity since pre-Columbian times, when indigenous peoples used gold for jewelry and tools. During colonization, gold mining by the Spanish triggered the development of the first cities, such as Popayan and Cali, as a result of mining activities in nearby areas. The Spanish utilized indigenous peoples and later African slaves as laborers, who acquired knowledge of the mining process in this way. After independence, mining continued to be important to the economy, and in the nineteenth century, Colombia was the largest gold producer in the world (Instituto de Estudios Colombianos 1987). During this time, mineral resources were declared property of the Nation, establishing a direct link between the development of the mining industry and the economic development of the country (Bolívar 1829).

The history of gold mining is important for understanding the current social, economic and environmental dynamics in mining. The following section describes the history of gold mining after independence from Spain in the 1800s. Mining after independence was governed by foreign investors from England and Germany who, throughout the nineteenth and parts of the twentieth century, turned gold, silver and platinum into the main export products of Colombia. During this time, Colombia was the world's leading producer of gold.

The first industrial mining operations began in the late 1800s and by 1910 there were approximately 35 companies, concentrated in Antioquia, Chocó, Cauca, and Nariño (Instituto de Estudios Colombianos 1987). Despite the existence of these industrial operations, most of the production continued to be from small-scale mining operations, which then contributed almost 80 percent of the gold production (Instituto de Estudios Colombianos 1987).

According to government data, gold production reached its peak around 1940. After the 1950s, the manufacturing, agriculture and livestock industry gained greater participation in Colombia's national economy. Since then, mining has not represented more than 5 percent of the gross domestic product (Poveda 2002). Although official statistics from the government show a steep decline in production from 1950 to 1980, the literature suggests that the decline in official statistics was due to contraband activities, rather than a decline in national production (Instituto de Estudios Colombianos 1987). Once national prices were set equal to international market prices, national production figures increased considerably.

Figure 1. Gold production in Colombia 1931-2009



Source: UPME 2009.

In the 1970s, many foreign companies stopped mining activities because mineral reserves were exhausted and the gold price was low (Instituto de Estudios Colombianos 1987). After prices increased in

the 1980s, mining became profitable again and production resumed. In the last ten years, Colombia has seen record levels of gold production, largely due to changes in public policies, an increased security, and of course the higher gold price (see also figure 1). Antioquia continues to be the leading producer, followed by Chocó, which together account for about 80 percent of the national gold production (Wacaster 2010).

Today, the mining sector occupies the eighth place and only generates 3 percent of total GDP (7 percent if we include petroleum), but its importance is expected to increase (DANE 2011). According to government projections, mining will contribute between 4.5 to 4.8 percent to economic growth and mining will provide around 100,000 additional jobs, many of these in large-scale gold mining projects (National Planning Department 2010: 562). The following sections describe in more detail the current situation in the gold mining sector.

Stakeholders and organizations in gold mining

The long tradition of mining in Colombia has created an organizational framework for the mining sector that contains many actors, such as small and large-scale miners, state agencies, policy makers, private companies and entrepreneurs, academia, mining associations and organizations (Ministerio de Minas y Energía 2009). Below is a description of how these stakeholders intervene in the mining policy process and what are considered the main problems with regard to the artisanal and small-scale mining sector.

At the national and regional level, there are the mining authorities who are regulating and promoting the mining industry. This group includes the Geological Service (Ingeominas) of the Ministry of Mines (Ministerio de Minas y Energía 2010).¹ Within the Ministry of Mines there is a Formalization Division which deals with issues related to small-scale mining. Additionally, there is an office of environmental and ethnic affairs that deals with issues associated with mining in Indigenous and Afro-Colombian communities. The Geological Service has national and regional offices and is focused on generating knowledge about the geological processes in Colombia. Today the National Minerals Agency is in charge of managing mineral resources by issuing mining titles and enforcing mining regulations (Ingeominas 2011). Departmental administrators are also involved in managing mineral resources, by issuing mining titles and enforcing mining regulations. On the environmental front, the Ministry of Environment and the Regional Environmental Authorities are responsible for developing policies and guidelines related to environmental management as well as their enforcement. There is also

the Unit for Planning of Minerals and Mining (UPME). This agency is involved in planning of the mining and energy sectors as well as consolidating and disseminating information (UPME 2009). The UPME plays a strategic role in the promotion of Colombia as a mineral rich country (Sarmiento 2010: 23).

Generally speaking the policymakers at the national level have been recognized for favoring the interest of large-mining companies over the interest of small-scale miners. Mining companies, and their associations, created to promote the interests of the large mining companies have been closely intertwined with government agencies. This is reflected by the fact that currently there are no differential policies that reflect the reality of the mining sector where the majority of the workforce is involved in small-scale mining. Mining labor organizations appear to be invisible.

Regional and local governments govern the 33 departments and the 1,103 municipalities in Colombia. Both the departments and municipalities are run by locally elected officials, who are in charge of economic development, but also in preserving environmental quality and minimizing social unrest (Fedemunicipios 2009). Local officials are responsible for distributing royalties from mining at the local level and also implementing and enforcing some laws and regulations related to mining and environmental conservation. Municipal governments have the authority to close mining operations that do not meet environmental and safety standards (Law number 99, 1993). In practice, regional and local authorities have difficulties in enforcing the law. Oftentimes, money from royalties is not properly spent, and ironically many of the producing municipalities have the highest levels of poverty in the country (Rudas 2012). Additionally, municipal administrators have informal agreements with small-scale miners by which they authorize their activity despite legality of the mines of the environmental damage that they might be causing (Sarmiento et al. 2012) Furthermore, in the case of the environmental authorities that operate at this level, they have also been involved in corruption scandals, whereby small-scale mechanized miners will bribe officials so that they will not take action against them (Osorio 2012). Many local authorities and communities advocate for mining as a source of employment, at the same time they advocate for a clean and healthy environment, which does not always go together.

Under the current context, where the mining code is undergoing reform, where the presence of illegal armed groups in the small-scale mining sector has drawn the attention of the police force, but also where there is significant interest on behalf of large-scale multinational companies in gold mining, mobilization and organization on behalf of small-scale miners has spurred. As a result, associations of small-scale miners at the national, regional and local level have gained strength. These organization have become visible in the policy

process by participating in wide spread mobilizations. They claim that despite the fact that the government has set the mining industry as one of the pillars of economic development, small-scale miners have been left out (Osorio 2012). However, government officials and large companies have claimed that many of these associations are being promoted by illegal armed groups. As a result many of the small-scale miners who are informal are constantly trying to demonstrate that they are not involved with illegal armed groups (Osorio 2012).

Additionally, in the last decade, several networks of social, ethnic and environmental organizations have formed, advocating for the protection of human, ethnic, and land rights as well as for environmental protection in the mining sector. Many of these organizations have advocated for the development of an inclusive public policy that takes into account small, medium, and large-scale mining companies as well as local communities. One network that stands out for its activism is the “Colombian Network Against Large-scale Transnational Mining”. Furthermore, since 2010 inter-institutional and community networks have been established in the Pacific region and the department of Chocó. These networks consist of public and non-profit entities that are promoting reforms in public mining policy as well as the promotion of mining operations that have greater community involvement and are focused on social, economic and environmental responsibility. Some of these networks are: The Permanent Board for Responsible Mining in the Colombian Pacific, the Inter-Institutional Committee for the Promotion of Responsible Mining in Biogeographic Chocó, and the Renacer Negro Campaign.

A specific stakeholder group that plays a significant role in the country are the media. The media have motivated public debate by filling newspapers, magazines, radio and television with stories of mining operations and projects that exemplify the tensions and conflict between the environmental and mining interests of the communities. The media have allowed citizens to become engaged in the debate, and they have played a mediating role. They have elevated the perspectives of different stakeholders on the mining projects and provided a forum for discussion. As a result, the media have gained significant power and influence over the policy agenda. At the same time, communities as well as independent news sources have demonstrated how the media have been influenced by large multinational mining companies (Anon 2012). In fact, mobilizations by small-scale miners have been largely underplayed by the mainstream media.

The legal and policy framework

In Colombia, mining activities are regulated through the Mining Code. Since the 1800s, mining regulations have always followed the principle that all mineral deposits are property of the state. Currently, the main mining regulation is the Mining Code of 2001, with some reforms that were tried to be made in 2010. These policy changes were in response to a disorganized expansion of the mining sector, resulting from a “first come, first serve” policy as well as overlapping land use claims between environmental conservation areas and mining titles that resulted in conflicts. Also, loopholes in the Code were used by mining companies and entrepreneurs to obtain lower fees.

In 2010, the Mining Code was modified through Law 1382. The main modifications involved renewal periods of concession agreements, length of the exploratory phase, as well as mining in ecologically sensitive areas. Despite the Mining Code reform, the Constitutional Court declared it unconstitutional (Decision C-366-11 s.f.) because Indigenous and Afro-Colombian communities were not consulted prior to the passing of the law. The decision was based on the Convention 169 of the International Labor Organization (ILO), which was ratified by Colombia in addition to other articles of the Constitution and other decisions of the Constitutional courts.² Because the court considered that Law 1382 was important for sustainable development, given that it excluded ecologically sensitive areas from mining, the court temporarily withheld the reforms and gave two years for doing the consultation process with indigenous and Afro-Colombian communities. Currently the Mining Code is in the process of being reformed and consultations are taken place throughout the country.

The most important aspects of the Mining Code and its reforms are explained below. First, any person can have access to a mining title as long as a series of requirements established by the mining authority are fulfilled. Specifically, the Mining Code establishes that exploration and exploitation rights are only granted through a mining concession agreement. The Mining Concession Agreement includes the authorization of activities related to exploration, construction, exploitation, and mine closure phases and they are granted for periods of up to thirty years. This term may be extended upon request by the title holder for an additional 20 year term. Mining rights are granted for specific minerals within the concession area. However, if the title holder finds other minerals within, he or she may file a request to extend the object of the agreement to include them.

Second, the mining code distinguishes two mining categories: the one that does not require a title, which applies to the use of artisanal mining, and the mining that does require a title that corresponds to any mining venture supported by conventional mechanical equip-

ment. The Code does not differentiate on aspects regarding economic capacity, size of the mining area, human resource or technology level for example.

Third, in relation to the environmental requirements, Colombian laws distinguish between the environmental requirements for exploration activities, and those that have to be fulfilled for construction and exploitation works. During the exploration phase the titleholder does not require a license, however he or she still has to petition for individual natural resource use permits, such as water use permits, and follow environmental management guidelines issued by the government. For the construction and exploitation operations, the titleholder must obtain an environmental license based on an environmental impact assessment (EIA). The EIA includes a description of the project, the renewable resources that will be affected, and mitigation, restoration and compensation activities. Depending on the size of the mining project, the environmental license is issued by the Environmental Ministry or the Regional Environmental Authority (CAR).

Illegal mining refers to mining that does not meet the conditions mentioned above and that does not have the corresponding permits. Illegal miners within forest reserves cannot be legalized because this type of activity is prohibited within those areas. The Code offers legalization opportunities for traditional or artisanal mining that do not have all the permits issued, but that have taken place in the last 5 years in a permanent manner and that have been taking place before 2000. In the past, legalization initiatives have not been successful in part because of lack of capacity building and cumbersome requirement. Since the 1990s, there have been three legalization initiatives but less than one percent of the legalization requests have been processed (Defensoria del Pueblo 2011).

As mentioned above, the current mining regulation does not distinguish between different sizes of mining enterprises, making it difficult for small-scale miners to fulfill all the requirements. Also, in the current mining policy, panning is the only artisanal mining technique that is recognized and thus all other operations using non-mechanized mining techniques have to fulfill the same requirements as larger mining enterprises. Although the Mining Code recognized mining areas within collective land titles, this does not mean that those communities have mining titles. They still have to apply for a mining title and it is possible that private individuals apply for a mining title inside the mining area. If a company wants a mining title in an indigenous or Afro-Colombian territory, the ethnic communities are notified and given thirty days to file all the relevant documentation so that they can be granted the mining title. If they do not file the documentation accordingly, the mining title is automatically given to the company or individual that previously made the request.

This is a recurrent source of conflict between Afro-Colombian and indigenous communities, the Government and mining companies.

It is important to note that in the case of artisanal mining in Afro-Colombian and indigenous communities, the communities themselves have created local rules and norms related to mining activities. These rules only apply for members of the community and are many times ignored by illegal miners that are outsiders to these areas as well as larger legal operations. The rules include issues such as designated areas for mining, fees, natural resource care and decision making bodies (Consejo Comunitario Mayor del Alto San Juan (ASOCASAN) 2009).

The National Government collects fees and royalties, based on the volume produced and the market price of the good. The royalties for gold and silver are four percent, and for alluvial gold six percent. Royalties are distributed to municipalities and provinces, to a national royalties fund, and to the environmental authorities and mining authorities and other government entities. In 2012, the royalties law was changed and now 50 percent of the royalties go to producing municipalities and departments, and the other 50 percent is distributed among multiple funds: regional development, compensation, science, technology and innovation, pensions and savings, and economic stabilization (República de Colombia 2012). This differs from the previous law in which approximately 80 percent were direct royalties to producing local governments, and 20 percent to the national royalties fund. (Presidencia de la República 2012). Initially, during the exploration and construction phases, the holder of a concession agreement must pay a surface fee. For the construction phase, the title holder has to pay a surface fee at the same rate that it paid during the exploration phase (Cardenas and Martínez 2012). All mining operations, including artisanal miners, regardless of their size must pay these royalties and fees.

Large-scale, small-scale and artisanal gold mining in Colombia

In Colombia, there are currently approximately forty major mining companies, both national and international, involved in medium and large-scale mining exploitation. Of those, only three are involved in gold mining exploitation, which are Mineros S.A, Frontino Gold Mines, and Aluviones de Colombia (Wacaster 2010: 8-10). There are other large gold mining companies such as Gran Colombia Gold, AngloGold Ashanti, EcoOro that are doing exploration. The three large-scale gold mining companies currently produce approximately 30 percent of the gold, while small-scale mining operations account for approximately 70 percent of the national production. In total, the sector generates approximately 140,000 permanent jobs, although

there is also informal employment in small-scale operations, which is not included in this number (International Labour Organization 2011). In 2009, Colombia produced 47,837 kilograms of gold, in 2010 approximately 53,000 kilograms were produced, and in 2011 56,000 kilograms (UPME 2009). This shows a steep incline of production which should be mainly attributed to the rising prices and increased activity.

The mining techniques used by large companies include open pit, alluvial, and underground mining. In general, deposits within 100 meters of the surface are extracted from open pit mines or alluvial mines and those at greater depths come from underground mines. The large mining companies that are in the exploitation phase have mining rights recognized through the National Mining Registry, a concession contract and all environmental permits. They often exert their power and legal status to expel local communities and also those who have traditionally mined in places where these companies have acquired mining titles. In general, the small-scale miners have little means to fight back.

However, a considerable part of the gold production comes from small-scale mining operations. Small-scale mining takes place throughout the Chocó bioregion, as well as in some areas of the Andean region of the country. The Chocó region is mostly inhabited by Afro-Colombian communities who are descendants of African slaves, as well as Indigenous communities. Of the 93 municipalities that constitute the Biogeographic Chocó region, approximately thirty municipalities are engaged in mining, principally for the exploitation of gold, silver and platinum.

In Colombia, a distinction is often made between artisanal mining and small-scale mechanized mining operations. This distinction is made by both the government as well as by local communities, although they have different ways of defining the terms. The government only recognizes panning as artisanal practices, whereas the communities have a much broader understanding of what artisanal mining is, including forms of mining that use small machinery, like pumps. The artisanal mining techniques developed by Afro-Colombian communities during colonization are all based on manual labor. Some techniques also rely heavily on the presence of water, because it facilitates the breakdown and transport of minerals. Depending on the location of the mineral deposit, the techniques used are referred to as *Mazamorreo*, *Sambuyidero*, *Cascajero*, *Aguacorrida*, *Barequeo*, *Hoyadero* or *Guaches*.

Contrary to large-scale mining, in most of these artisanal mining techniques no chemicals are used for mineral extraction, like mercury or cyanide. Sometimes they use resin from trees to retain more gold. In artisanal mining, men, women and children participate. For example, in the *Mazamorreo* technique, women do most of the labor

and in the Chocó region, many children begin working when they are three years old, washing gold and when they turn six, they start breaking rocks and washing them. In indigenous and Afro-Colombian communities, the participation of children in gold mining is part of the traditional practices and activities.

Non-artisanal small-scale miners use mechanized equipment. In the Chocó region, some of the equipment used includes small suction dredges, sluice boxes and water pumps. More sophisticated small-scale mining operation use hydraulic excavators and suction

Figure 1. *Mazamorreo* or panning technique



This artisanal method involves getting the gravel from the riverbeds and the gravel banks of the rivers, which is washed in the pan until the gold and the platinum appear. Photograph by Alejandro Cock.

and spoon dredges. It is estimated that they can move around 500 m³ of soil in a day and water consumption varies from 2,200 to 2,500 m³/day in these operations. In each production unit, called *entable*, there are about twenty men working and one or two women cooking. Women and children often work additionally on these sites as *barequeros*, using the panning technique.

It is estimated that artisanal and small-scale mining takes place in 44 percent of the municipalities in Colombia. Some studies suggest that at least 15,000 families live from small-scale mining distributed

Figure 2. *Cascajero* or gravel mining



This is the method in which the miners extract the stones from the river and then break them to extract the metal. Photograph by Alejandro Cock.

Figure 3. *Zambuyidero* or diving technique



This artisanal method used in prolonged summer periods, when river levels drop. The gold is located at the bottom of the river and the miner makes successive dives to take out the gold and platinum containing material which is washed using a pan. Photograph by Kike Arnal.

Figure 4. *Los guaches, hoyadero*, or underground mining



This is one of the most common techniques in the Chocó area. It is an excavated pit, with walls held by wooden poles. The depth of the holes depends on the distance of the place where the gold and the platinum are located, but can be up to 15 meters deep. Photograph by Oro Verde.

Figure 5. Small-scale mechanized mining



This is mining that uses mechanized equipment, such as small suction dredges, water pumps, sluice boxes, hydraulic excavators, and suction and spoon dredges. Photograph by Oro Verde.

Figure 6. *Barequeros*



These are subsistence miners from local communities that do panning in areas where small-scale mechanized miners are working. Photograph by Oro Verde.

Figure 7. Agua Corrida



Artisanal mining method performed by Afro-Colombian communities where sands are washed utilizing water pressure. Ponds, gravity and occasionally small water pumps are utilized for creating pressure. Photograph by Oro Verde.

over 3,600 mines (Defensoria del Pueblo 2011). But this may be an underestimation. Generally speaking, the artisanal mining provides a modest income (5-20 USD/day), often additional to other activities such as farming. That is why nowadays we see many initiatives to scale up a mining operation by using machinery, which allows the processing of more material and a higher income. However, by increasing the dimensions of the mining operation, of course the dimension of environmental impacts increases accordingly. This process is visible and under heavy debate by the local communities, who

see themselves divided between their way to development and conservation of the local environment.

Another important point is the legal situation of artisanal and small-scale mining. The Peasant, Indigenous, and Afro-Colombian communities who perform small-scale mining, usually have legal titles to their land or have traditionally occupied the land. The majority of these mines do not have the environmental and mining permits however requested by the Government who often considers them illegal and informal (Defensoría del Pueblo 2011). With the rising commodity prices, informal businessmen, migrants from other parts of Colombia, and illegal armed groups have more and more become involved in gold mining or have started mining themselves. This entrance of outside agents has caused a lot of conflict and situations of abuse of the local resident miners. Since this new group of miners comes from outside the region and do not own titles to the land or to the mineral resources, they display a short term vision focused on making high profits in little time, without any environmental concerns.

Conflict in gold mining

The interactions of the different organizations and stakeholders, and contradicting laws and policies have resulted in a series of conflicts surrounding gold mining. The main conflicts involve the expansion of large gold mining projects, such as the case of Aluviones del Pacífico in the Chocó region and Gran Colombia gold in the Andean region, in areas where small-scale miners have been present, but also violence and human rights violations, environmental impacts, and regulatory contradictions are reasons for the current conflict.

The expansion of mining projects and titling processes has generated tension in rural areas between small and large-scale miners as well as the government. In the last eight years more than eight thousand new titles have been issued, while legalization processes have not moved forward (Defensoría del Pueblo, 2011). As a result, small-scale miners that have been working in an area for decades cannot legalize their practices, because a title was already awarded to a multinational corporation (Osorio 2012). This has resulted in an equity problem, where small-scale miners are at a disadvantage as a result of their limited skills and financial resources as well as access to government services.

In the case of large-scale versus artisanal mining, there is a conflict that arises from having different visions of what mining is for. In Colombia, artisanal mining is done by Afro-Colombian and indigenous peoples that have very strong ties to their land and it does not follow the same logics as large-scale mining or even small-scale

mechanized mining, nor does it have the same social and environmental impacts. For ethnic communities, mining is a means of subsistence, in combination with agriculture, fishing and forestry activities. Additionally, artisanal mining represents ancestral knowledge that has been used throughout time to allow communities to at least sustain over generations. This contrasts with industrial mining techniques that aim to extract mineral deposits in the most quick, efficient and cost effective ways.

Another condition that promotes violence and human rights violations and further aggravates conflict, is that small-scale mining has been associated with drug trafficking operations, money laundering and financing of illegal armed groups. Drug traffickers typically buy gold from small-scale miners or are involved in mining operations directly to launder money. This gold is then reported as having come from legal mining operations. Additionally, gold extracted from small-scale mining has often been used to finance illegal armed groups such as guerrillas and paramilitaries (Defensoria del Pueblo 2011). Often, illegal armed groups will extort small-scale miners by asking for monthly payments which are often made in gold. According to the National Army, guerrillas can receive almost 50,000 dollars with such extortions. Some of the municipalities where small-scale mining predominates, homicide rates are some of the highest. For example in one of the leading gold producing municipalities, the homicide rate was 189 per 100,000 inhabitants last year, compared with a national average of only 35 per 100,000, according to federal officials. These homicides are often the result of territorial struggles between armed groups which are financing their operations from gold mining (Romero 2011). The isolation and poverty of the areas where small-scale mining takes place, as well the presence of illegal armed groups make these areas particularly vulnerable to human rights violations.

Another conflict that is recurrent in small-scale mining is associated with the itinerant nature of small-scale mechanized miners, who do not have mining titles. Migration of small-scale miners responds to high gold prices or the occasional discovery of mineral deposits that are easy to access. For example, in the 1970s and 1980s there was a large migration of Afro-Colombian miners of the Pacific to the Bajo Cauca of Antioquia (Segovia, Caucaasia, El Bagre, Zaragoza among others), due to the discovery of low lying deposits in the area; since the mid-1980s informal mining businessmen from Antioquia, Córdoba, Bolívar, Tolima, Valle del Cauca, and Cundinamarca (more than 200 mining ventures) migrated to the department of Chocó with heavy machinery for exploitation in alluvial floodplains of the San Juan, Condoto, Tamaná, and Atrato basins. During 2009 and 2010, there was a significant migration of small-scale miners to the Dagua river near Buenaventura in Valle del Cauca (Pardo 2010). Local and

regional government agencies estimated that by April of 2010 there were more than 7,000 miners from different regions of the country, 236 bulldozers and loaders, and 100 “Brazilian” dredges in a 30 km radius (Anon. 2010). Similar phenomena has also been witnessed in departments as Tolima, and the South Bolivar.

These migratory processes have led to problems and conflicts associated with natural resource use, but also conflicts resulting from cultural clashes and the disruption of traditional practices. The inflow of outsiders and constant migration in search for some type of income affects social cohesion and local governance and makes communities more vulnerable to displacement.

As mentioned earlier, mining has been associated with significant environmental impacts because the functionality of natural ecosystems and the services they provide is altered as a result of disturbances to landscape, water, air and the generation of waste. This applies to both large and small-scale mining. In the case of small-scale mechanized mining this is particularly important because there is little to no environmental management: there are no restoration activities, mercury and cyanide use is abundant, and the capacity of environmental authorities to enforce regulations is limited. This is in contrast with formal mining operations where environmental management practices are required and typically they are enforced.

Water pollution from mining in Colombia has been connected to mercury and cyanide use as well as sedimentation of water bodies. According to the United Nations, per capita mercury pollution rates in Colombia are the highest in the world. It is estimated that between 50 to 100 tons of mercury per year contaminate water ways. In Antioquia alone approximately 50 tons of mercury contaminate rivers in the municipalities of Remedios, Segovia, Zaragoza, El Bagre, and Niza, where 90 percent of the population live from mining (Cordy et al. 2011). Water pollution affects the aquatic habitat and poses human health problems because of elevated mercury concentrations in fish. Studies show that there is a direct relationship between mercury concentrations in the water and high concentration in fish living close to gold mining areas. Sampling has demonstrated that in several regions mercury levels are well above international standards (Mancera-Rodríguez and Álvarez-León 2006). Regarding deforestation, there is currently no national data on the effects of small-scale mining. Currently the Ministry of Environment and the Ministry of Mines, with support from the World Bank are beginning to address this issue. Studies suggest that in the Chocó region alone 360 hectares per year are degraded and deforested as a result of mining (Ramírez-Moreno and Ledezma-Rentería 2007).

Overlapping land use regulations and poorly administered mining titles also cause conflicts. The most salient example of overlapping land use regulations is the ongoing controversy regarding a vast

gold mining project by the South African Company Anglo Gold Ashanti in the Department of Tolima. In this case, there was an official authorization to do mineral exploration that overlapped with a land use regulation, issued by the Ministry of Environment that declared this area as a national forest reserve. Additionally, the regional environmental authority had recently completed a watershed management plan that resulted in another land use regulation that designated the same place where the mining project was proposed as a water conservation area because the area hosts many headwaters that supply water for downstream users; particularly the city of Ibagué, home to 500,000 people and large rice production activities. Today this conflict remains unresolved, although the company continues to perform exploratory activities (Sarmiento 2011).

Finally the mixing of public versus personal interests further aggravates conflict and the ability of government agencies to enforce regulations accordingly. For example, the board of directors within regional environmental authorities often includes representatives of local and regional governments that directly benefit from mining operations (Sarmiento 2011). This creates a conflict of interests that affects strict enforcement of environmental regulations because at all levels of government there is an interest in providing income generating activities, employment opportunities and social stability. At the same time, many mechanized miners have political and economic ties to local administrations. Mechanized miners will make informal payments to local administrations in exchange for allowing them to mine within their jurisdiction. This often creates conflict with Indigenous and Afro-Colombian communities because mechanized miners will ignore the traditional authorities of these groups.

Conclusion

The gold mining sector in Colombia has evolved and expanded significantly in the last 10 years as a result of the changes in public policy, the rising price of gold, and a relative improvement of security in rural areas. These trends have undermined the longstanding tradition of small-scale and artisanal miners in Colombia, giving priority to large-scale multinational mining companies.

The current policy framework is tailored in a way that treats small-scale mining almost the same as large-scale miners to a point that it makes them invisible. This is problematic because these miners do not have the same access to financial and technical resources, which then motivates informal mining operations; all of this within a context of increased mining exploration by international companies and the existence of illegal armed groups that are extorting miners and are using gold as a means of money laundering. Consequently

small-scale miners of all types, are in areas where conflict predominates and as a result, the livelihoods of thousands of people are being threatened. Artisanal miners are the most vulnerable because of the small economic returns that they receive and the minimal political power that they have.

The long tradition of small-scale mining in Colombia cannot be ignored. One thing to consider is that even though many of these miners do not have official mining titles, many of them have been mining for generations and in many aspects have been legitimized by local communities. Contrary to the long tradition of small-scale mining in Colombia, the current gold rush is provoking significant environmental and social impacts that require immediate attention. Strategies to highlight the contribution of small-scale mining to rural livelihoods, as well as the need to improve management practices of these operations are necessary in order to begin to mitigate and manage many of the recurring conflicts.

Notes

- ¹ In 2012, the National Mineral Agency was created. This agency took over some responsibilities of the Geological Service and became the administrator of the national mining registration.
- ² Article 6 of Agreement 169 of the International Labor Organization, article 93 of the Constitution, and article 330, which consecrates the extraction of resources, without consideration of the cultural, social and economic integrity of native communities; and Sentence C-175/09, which states the procedures for the performance of the previous consultation.

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SMALL-SCALE GOLD MINING AND SOCIAL AND ENVIRONMENTAL CONFLICT IN THE PERUVIAN AMAZON

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Introduction

This chapter provides an overview of gold mining in Peru and looks particularly at small-scale gold mining in the Peruvian Amazon. It describes mining development in Peru over the last twenty years, which has seen a spectacular increase and unfortunately has been accompanied by very high rates of social and environmental unrest in the country and especially in the Madre de Dios region. It discusses the official mining classification and the characteristics of small-scale and artisanal gold mining and looks at the impacts on the environment and public health in mining areas. It also gives the legal and institutional framework of the small-scale and artisanal mining formalization process.

The final part of this chapter highlights the continuous protests and conflicts between Peruvian Government and the heterogeneous miners organizations in Madre de Dios, which grew after military and police interventions in October and November of 2011 and in the first half of 2012. The main reason for protest was a number of new decrees intended to start formalization of small-scale mining, with an intention to organize and concentrate gold mining in a territory called the mining corridor and exclude mining in other areas, such

as the Tambopata Reserve buffer zone. Until now, there is little progress with regard to formalization, and the situation in Madre de Dios remains tense.

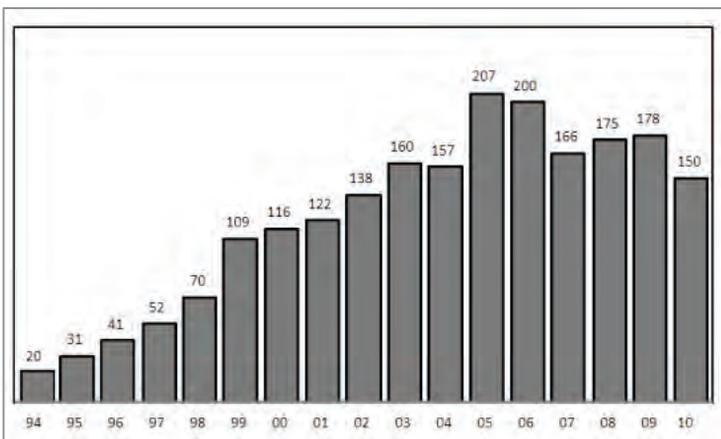
In general, the situation in Peru is characterized by conflicts about access to, or ownership of natural resources and territory, environmental impacts and consequent social mobilization requesting real benefits for the people. The Government lacks effective policies or measures, but instead answers with repressive interventions and unsuccessful negotiations. This context also influences the situation in Madre de Dios. This chapter's preliminary conclusions encourage to further address the social and environmental unrest around gold mining in the Madre de Dios department and the country in general, and improve government interventions, with the aim to improve the lives of the small-scale gold miners and the populations that surround them.

The expanding Peruvian mining sector and national gold production

Peru is one of the top producers of the world's most important metals. Between 1994 and 2005, gold production in Peru rose from 20 to 207 tons. Production fell to 150 tons in 2010 (see figure 1). It remains Latin America's most important gold producer and in the last decades Peru has become one of the chief destinations of exploration and mining project investments in Latin America (see table 1).

Peru's expansion in mining investments and production began in 1993, when the Yanacocha mining company started operations in

Figure 1. Peru: gold production in fine metric tons (1994 -2010)



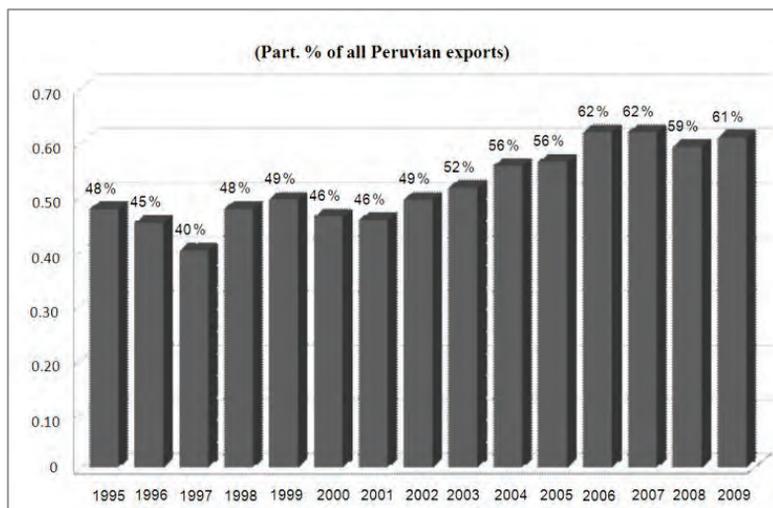
Source: Ministry of Energy and Mines 2010. Drafted by CooperAcción.

Table 1. Peru's position in Latin America and in the world in metal production (2010)

Main products		Position	
		Latin America	World
Silver	(Kg)	1°	1°
Zinc	(TM)	1°	2°
Tin	(TM)	1°	3°
Lead	(TM)	1°	4°
Gold	(Kg)	1°	6°
Copper	(TM)	2°	2°
Molybdenum	(TM)	2°	4°
Iron	(TM)	5°	17°

Source: United States Geological Survey 2011. Drafted by CooperAcción.

large-scale gold mining in northern Peru. Between 1995 and 2009, mining contributed around 6 percent to the yearly GDP and contributed with over 60 percent to Peruvian exports (see figure 2). The expansion was based on a number of external as well as internal factors, such as the increased demand for minerals worldwide, rising prices of gold and other metals, financial markets willing to back major investment, but also a number of national structural reforms,

Figure 2. Mining exports in Peru (1995-2009)

Source: Peruvian Central Bank 2010. Drafted by CooperAcción.

which were geared towards making the country more attractive to investors.

Mining in Peru is officially divided into four categories: large-scale, medium-scale, small-scale and artisanal mining. The division is based on the size of the concession and the mine's daily production capacity. Artisanal mining was only recognized in 2002, for an area of up to 1,000 hectares of mining concession and a production capacity of 25 MT/day.¹ See also table 2 for a complete overview of the classification system of mining in Peru.

Table 2. Mining classification system

Category	Concession Area	Production Capacity
Large-scale	Over 2,000 Ha	Over 5,000 MT/day
Medium-scale	Over 2,000 Ha	Up to 5,000 MT/day
Small-scale	Up to 2,000 Ha	Up to 350 MT/day (1)
Artisanal	Up to 1,000 Ha	Up to 25 MT/day (2)

(1) Small-scale mining: for non-metallic and construction materials: 1,200 MT/day and placer-type metallic deposits: 3,000 m³/day

(2) Artisanal mining: for non-metallic and construction materials: 100 MT/day and placer-type metallic deposits: 200 m³/day

Source: Ministry of Energy and Mines 2002.

In Peru, most of the gold is produced in large and medium-scale mines. In 2010, 85 percent of the total gold production was produced by these two categories and three large-scale mining companies accounted for 55 percent of Peru's gold production: Yanacocha, followed by Barrick Misquichilca and Buenaventura (Ministry of Energy and Mines 2010). The small-scale and artisanal mining accounted for the remaining 15 percent, of which 12 percent was produced by the mines of alluvial gold deposits in the Amazon and some Andean regions. This is called "placer mining", which refers to the alluvial mining of riverbanks and borders. The remaining 3 percent is produced by small-scale gold mining in primary bedrock, principally in the Peruvian Andes (Ibid. 2010) (see also table 3).

The category 'informal mining' refers to mining activities mostly in the small-scale and artisanal categories that are not recognized and formalized by the State and the mining and environmental ministries involved. A very small number of these informal miners are in the process of formalization in order to obtain concession rights. They need to have an environmental study and other registrations approved, pay some taxes and comply with a number of labor regulations. As is shown in table 3, a high percentage of the small-scale and artisanal miners are in the category of informal miners; they have not yet been formalized, because of the very complicated procedures,

Table 3. Gold production by categories (1998 -2010)

GOLD PRODUCTION PER STRATA (Thousands of fine ounces)					TOTAL
	LARGE/ MEDIUM MINING	SMALL MINING	ARTISANAL MINING	INFORMAL	
1998	2,230	74	---	725	3,029
1999	3,510	44	---	577	4,131
2000	3,723	10	---	530	4,263
2001	3,906	13	---	534	4,454
2002	4,453	10	---	602	5,065
2003	5,106	31	0	413	5,550
2004	5,054	40	0	475	5,569
2005	6,125	44	1	517	6,687
2006	5,933	79	1	508	6,521
2007	4,817	129	1	526	5,473
2008	5,095	150	1	537	5,783
2009	5,164	197	1	553	5,916
2010	4,474	168	2	610	5,253

Source: Ministry of Energy and Mines 2010.

obligations, different kinds of payments, overwhelming paper bureaucracy, dependencies from governmental offices, employees and often arbitrary decisions and time schedules.

Despite the high production numbers and corresponding revenues in large-scale gold mining, it is important to note that formal large-scale mining provides direct employment to only one percent of the economically active population (EAP) (Ministry of Energy and Mines 2011). Main motivation to attract large-scale mining for governments is to amplify their national budget by means of taxes and other financial incomes from the large-scale mining companies. It does not automatically mean however, that growing national income is converted into local and national progress and sustainable human development. The mining regions in Peru are also the poorest regions of the country.

Small-scale and artisanal mining in Peru

Small-scale and artisanal gold production was traditionally present in four main areas in Peru: the Puno department; in the Central South

which includes the departments of Ica, Arequipa and Ayacucho; Madre de Dios; and the provinces of Pataz and Sánchez Carrión in the La Libertad department (Torres 2007). In recent years, it has been developing also in the department of Huancavelica; Cerro el Toro in La Libertad, Progreso in Apurímac; Ayabaca and Sullana in Piura and recently in the province of Canta in Lima. In the Central South, La Libertad and the other more recent mining areas, principally primary deposits (seam) are mined.² In Puno, both primary and secondary deposits are mined. The alluvial deposits are principally mined in Madre de Dios in the Amazon.

In Madre de Dios, gold mining has been expanding since the 1970s. This has produced a lot of inward migration and created links between the highland areas and the lowland areas around Puerto Maldonado (De la Torre 1987, Lossio 2002). Despite differences in Andean and Amazon historical and cultural characteristics, an economic enclave has formed around the mining activity, joining people with different backgrounds and customs. This process accelerated because of the recently finished Interoceanic Road, which connects Brazil with the Pacific harbors in southern Peru, via Puerto Maldonado, Cusco, and Puno, enhancing the mobility in this Amazon region that used to be difficult to access.

To date, there are no official data on the number of people involved in artisanal mining in Peru. Pachas (2011) analyzed information from the Ministry of Energy and Mines for the period between 1994 and 2009 and states that in 2009, there were approximately 53,600 small-scale and artisanal miners and 268,000 people involved, including women and children (see table 4).³ Unlike large- and medium-scale mining, which is identified as men's work with little demand for manpower, small-scale and artisanal mining involves generally the whole family as well as migrant workers as temporal miners. Romero et al. (2005) show that in underground mining, the women are involved in *pallaqueo*, which is the recovery of mineral rock from rubble. This helps them to cover some of their household costs. In alluvial mining areas, women are also involved in managing the mining operations and some are leaders of their mining or trade associations. According to the ILO (2004), in most cases women have to work with their smallest children, since they have nowhere else to leave them. When they are older, the children get involved in the work themselves.

Together with the growth of artisanal mining, there has been a shift in the mining populations working in each mining area. The number of people working in some of the traditional areas like Madre de Dios and Puno has decreased. This is mainly due to the effect of the gradually improving technology and use of machineries in these areas, which has driven many workers out of the area, to search for new gold mining areas elsewhere. Despite this reduction, Madre

de Dios is still the region with the highest number of people working in small-scale and artisanal mining.

Table 4. Number of People Working in Artisanal Mining (1994-2009)

Region	Number of People working in artisanal mining					
	1994		1997			
	Population	%	Population	%	Population	%
Madre de Dios	8,500	23	9,500	42		
Puno	15,000	41	7,562	34		
Central South	12,459	33.9	4,690	21		
La Libertad	700	2	700	3		
Canta						
Other*						
TOTAL	36,659	100	22,452	100		

Region	Number of People working in artisanal mining					
	2001		2007		2009	
	Population	%	Population	%	Population	%
Madre de Dios	9,500	31	20,000	38	15,000	28
Puno	14,000	46	20,000	38	10,000	19
Central South	6,000	20	8,000	15	8,000	15
La Libertad	830	3	3,500	7	4,500	8
Canta			1,500	3	1,500	3
Other*					14,600	27
TOTAL	30,330	100	53,000	100	53,600	100

*In other departments. *Source:* Pachas 2011.

Small-scale and artisanal gold mining techniques in Peru vary according to the type of mine deposit. A primary deposit seam is mined via shafts. Miners dig narrow tunnels or chambers with explosives along the gold seam. Miners also collect the mineral from the slag heaps. To recover gold, the mineral is processed by rollers – this is rudimentary machinery for grinding the ore into fine sand – and treated with mercury or in cyanide treatment tanks to concentrate the gold particles (Torres 2007).

In alluvial, or ‘placer’ mining, gold is extracted from channels, lakes or wells where fine gold particles have gathered at the bottom of the water body and formed a mineral deposit. In Madre de Dios, different techniques are used: some are artisanal techniques, like mills, channels, and sweepers; some are semi-mechanized techniques, like water suction, solid suction, rafts, front-loading chutes and lance-style sweepers; and some are fully mechanized techniques, including 16" diameter or more suction sweepers (Mosquera et al. 2009). The gold is recovered by adding mercury to the process, which binds the gold particles and forms an amalgam. This amalgam is burned at the

mining site spot and in commercial stores in town to separate the gold from the mercury.

In the mining areas and the micro-watersheds where the artisanal mining takes place, there is a high risk of environmental pollution by sediments and solid waste in the rivers and the unsuitable use and handling of waste and chemicals like cyanide and mercury (see table 6).

Figure 3. *Caranchera* mining in the river Madre de Dios, Peru, August 2012



Photograph taken by L. Cremers.

Figure 4. Mining using raft in Fortuna 1, Madre de Dios, Peru, August 2012



Photograph taken by L. Cremers.

Table 5. Small-scale and artisanal gold mining techniques in Peru

Andes: Puno	Amazon: Madre de Dios
<p><u>Sluice box:</u> involves demolishing gold terraces using rods; the ore is subsequently washed with water and poured along a sluice box, for the gold to settle at the bottom of the sluice box. The auriferous sand which remains at the bottom is collected each week, every two weeks or each month and is amalgamated with mercury.</p> <p><u>Lake:</u> underground tanks and pillars are drilled manually. Explosives are used to blow up the auriferous material and this is then placed in sluice boxes lined with stones and sluiced down with large amounts of water (stored in the lakes), moving and washing it. The gold falls to the bottom of the sluice box, the sand is removed and the ore goes into amalgamation.</p> <p><u>River-bed well:</u> this involves sinking wells in the beds of rivers, which have gold ore deposits that accumulate when the rivers are higher. The ore is recovered with shovels and taken in wheelbarrows to the sluice-box for washing.</p> <p><u>Pallaqueo:</u> recovery of mineral rock from rubble in underground mining.</p>	<p><u>Ore mill:</u> this is a method used in the rivers and gullies throughout the year. Miners use picks and shovels to move the auriferous material to a hand-built channel where it is carried by running water to a gold recovery sluice box.</p> <p><u>Sluice box:</u> this method is used along the rivers and in the dry season. Miners use shovels and wheelbarrows to heap the auriferous gravel onto a hopper on top of a recovery sluice box. The gravel is washed with plenty of water, with a 5 hp electric pump or by hand with a bucket.</p> <p><u>Sweeping:</u> Involves installing a pump (8 - 20 hp) to pump pressured water against the slope of the river bank or gully side, gradually eroding it. The resulting slurry is treated to extract the auriferous sands.</p> <p><u>Caranchera:</u> A diver takes a suction hose and vacuums up auriferous material from below the surface of the river using 4" to 8" diameter pumps.</p> <p><u>Chupadera:</u> Used on dry land but near water sources. Stable soil is swept away with spurts of water, and the material that remains under the water is vacuumed up with a suction pump. The gold is recovered from the soil with a sieve and hopper.</p> <p><u>Raft:</u> This is a mobile unit for extracting material from rivers or from riverside shores. The raft has a platform for carrying a suction pump and a sieve and hopper are put at the end of the hose. A mat is spread on top of that to catch the sand holding the gold.</p>

There is little information about the precise impact on the public health of the population in Peru, but several studies have indicated the severe effects of mercury pollution from small-scale mining. In Madre de Dios, the risk of pollution in the trophic chain as the result of the uncontrolled and inadequate handling of mercury is high. Studies show that mercury levels found in fish are above the maximum levels recommended by the WHO (500 µg Hg/kg) (Ministry of Environment 2011: 46). Therefore, the artisanal miners, as well as the local population, are exposed to dangerous levels of mercury contamination.

There is also a high incidence of deforestation because of mining in Madre de Dios. This has a severe impact on the environment, since deforestation in these parts is an almost irreversible process. Once the trees and the top soil have been removed, the area becomes desert-like and it becomes very difficult to regenerate the vegetation. Erosion occurs, causing run-off of suspended solids in the rivers and more chance of flash-floods downstream. In Madre de Dios, already at least 18,000 has. of forest have been destroyed (Ministry of Environment 2011: 66). The use of mercury, the deforestation and the change in soil use, as well as the creation of unplanned mining populations with no basic services are all environmental problems that need to be addressed with urgency.

The legal context of small-scale and artisanal mining in Peru

In the past, from the mid-1970s onwards, the Ministry of Energy and Mines has been supporting alluvial gold mining, also in Madre de Dios, through the Mining Bank (Banco Minero 1979-1992), the Small and Artisanal Mining Program (MAPEM: 1996-2000) and the Small-scale Mining Program (PEMIN 2000-2004). After this period, the government has taken a number of rather disconnected steps to address artisanal mining (Trillo and Pasco-Font 1994).

A number of legal documents are currently in place that deal specifically with small-scale and artisanal mining:

- a) The Small-scale Mining and Artisanal Mining Formalization and Promotion Act (Law 27651):

Mining is governed by the General Mining Law (D.S. N° 014-92-EM) issued in 1992. The Law contemplates small-scale mining, but had no definition or category for artisanal miners until 2002, when Law 27651 and its regulations recognized artisanal mining and incorporated it into the General Mining Act.⁴

The law defines artisanal miners as follows:

- Individuals or groups who privately or as a legally established entity work for their living in mining and/or benefit directly from minerals, manually or using rudimentary equipment.
- Owning up to 1,000 hectares, including mining claims, petitions and concessions; or having signed contracts with the mine owners.
- With an installed production capacity of 25 MT/day, and gold placer gravel producers with a capacity of up to 200 m³/day.

Table 6. Mining techniques and impact on the environment and public health

Region		Type of deposit	Use of reactive
Type	Name		
Andes	La Libertad	Primary (seam)	Cyanide and mercury
	Puno	Seam and alluvial	Cyanide and mercury
	South central (Arequipa, Ayacucho and Ica)	Seam	Cyanide and mercury
Amazon	Madre de Dios	Secondary (alluvial)	Mercury
Coast	Lima (Canta)	Seam	Cyanide and mercury

(*) In arid areas where there are no rivers nearby. Drafted by CooperAcción.

It stipulates the steps to be taken to become a formal artisanal miner: obtain a tax number (RUC), obtain a mining concession or a mining contract with the concession owner and an artisanal miner certificate (MINEM 2007). It also establishes obligations for artisanal miners regarding the environment: a) the Environmental Impact Declaration (DIA) for projects which have little effect on the environment and a semi-detailed Environment Impact Study (EIA) for projects which have a moderately negative impact; b) Environmental Management Plans throughout the activity and c) Closure Plans. The Regional Energy and Mines Offices (DREM) in all Peru's departments are responsible for environmental supervision and monitoring.

So far, its results have not been encouraging. Until April 2011, the Mining Department had only formalized 3,065 people as artisanal miners (metal and non-metal) and 3,906 as small-scale miners (metal and non-metal). In Madre de Dios, in April 2012, only 5 percent of a total 3,000 requests for formalization had been attended.

b) The National Plan for Formalizing Small-scale and Artisanal Mining:

In March 2011, the Ministry of Energy and Mines published Supreme Decree N° 013-2011 approving the National Plan for the Formalization of Artisanal Mining (PNFMA). It is a management tool, approved nine years after Law 27651 was enacted (Pachas 2011b)

The aim of the PNFMA is to formalize artisanal mining country-wide with legal, environmental, technical and organizational management tools. It has a two-fold strategy: (a) to formalize this kind of mining and (b) to promote sustainable artisanal mining. The plan is ambitious: its aim is for all artisanal mining to be formal by 2016.

In reality, informal artisanal mining in Peru is far more complex than the description in the PNFMA. It is not just the product of a major seasonal population shift of miners, it is also an activity of

Table 6. (continued)

Environmental impact			Impact on public health
Deforestation	River pollution (sediment and solid waste)	Chemical pollution of water and soil	
Very low	High	High	Yes
Very low	High	High	Yes
Very low	No(*)	High	Yes
High	High	High	Yes
Very low	Medium	High	Yes

farmers and native communities on their own land. As a result, it may be assumed that turning this activity into formal mining will be a complex process and one which will not simply involve granting concession titles. In Madre de Dios, the expansion of gold mining has made it one of the most common activities in the region and one of the main activities of some indigenous communities as well (Gray 1986). PNFMA is a positive step and one which implicitly contributes to arranging roles and functions and inter-agency relations of those directly involved in Peru's small-scale and artisanal mining. However, it must be acknowledged that the issues around mining cannot be reduced to formalization, and that the mining activity must be understood as a process of interaction between social and economic, environmental, labour, organization and also cultural aspects that should all be given due attention.

Social and environmental conflicts in the Madre de Dios Region

In Madre de Dios, mining has been present for decades and remained informal for many years. Between 1973 and 1978, the *Banco Minero* established a form of contract with the small-scale miners in the area. However, with the cancellation in 1978 of Decree Law N° 22178 that granted special rights to miners with a contract with the *Banco Minero*, mining was practically left as an informal activity. Even in the 1990s, when small-scale and artisanal mining grew, creating changes and unrest in the area with the native communities, no legal or administrative measures were taken. In the end, the question was addressed by the Government by suspending mining in various areas of the department (Pachas 2011b: 115-117).

In 1990, the Natural Reserve Tambopata was created and implemented to protect an area of high biodiversity south of the Madre de Dios river in the Tambopata province. It includes a so called 'buffer zone', which was created to diminish the influence of human activities on the actual Reserve's ecosystem within its boundaries. In this

buffer zone, in the Malinowski River basin, immigrants were already mining riverbanks, river bottom and related jungle bush strips before the park was officially declared. These traditional miner families and associations like APAYLOM, AMATAF, Munuani and Kotshimba were never told to leave the area nor the buffer zone. This changed drastically with the gold rush of the recent years. In February 2010, the Ministry of Environment issued Emergency Decree No. 012-2010 to prioritize the formalization of the small-scale and artisanal miners in Madre de Dios in order to stop destruction of the rainforest. The Decree contemplates mining zoning, exclusion areas and technical support. Since early 2011, the Ministry is also running a regional Government Support Program (APOGORE).

In order to accelerate the process, in the second half of 2011 several military and police interventions were realized to repress illegal small-scale and artisanal gold mining in the area. This included violent measures, such as the bombing of several small mining operation in the Malinowski river. Afterwards and after strong reactions and protests from different miners federations and associations, the Government declared new plans (Pachas 2012). These entail the organization and concentration of mining activities in Madre de Dios in a so called special mining strip or *corredor minero* and formalize mining activities, in April 2012 the Ministry of Energy and Mines formulated and published new Decrees, the 'Decretos Legislativos' DL 1100 about the intervention and annulation of illegal mining and the DL 1105, which delegate and support the Regional Governments in the formalization of small-scale mining.

But despite these measures, in practice the sector remains chaotic and the challenge remains to build appropriate mechanisms and policies to address and solve the range of social, environmental and cultural problems involved in small-scale and artisanal gold mining in Madre de Dios. An important aspect to be addressed here is the people's distrust to governmental measures, promises and actions, based on bad experiences from the past.

It is important to note the diversity of actors, next to the miners in the area, involved in the conflict. Besides, not all the miners organizations are the same, and follow the same strategies. The large federations, like FEDEMIN, have more influence and negotiate through their own channels with the national or regional government. Their viewpoints may contradict with other smaller miners associations. There are also agrarian federations, who express their concern and protest against the on-going miner's invasion. Sometimes however, their members can also be part of these mining activities as a part-time activity. The environmental NGOs present in the area are in favor of preserving the forest and are not well seen by the miner's organizations.

Another factor that adds to the unrest is the overlap between different kinds of land use and the invasion by incoming miners who open up new mining areas in the forest, invading areas that were formerly used for agricultural purposes for example. In some occasions, landowners formerly involved in agricultural or forestry activities turn to small-scale and artisanal gold mining in their territories, by working the terrain themselves or renting it to others to mine it. This completely transforms the management and control of the territory and its natural resources, with often detrimental effects for the water resources, river creeks, rivers and the small river basin itself. The same process occurs with the territory of native communities, who are victim but also sometimes active actor and part of these changes in land use and mining invasions.

The environmental conflict is a hot topic, always present in the mass media and official governmental discourses, who spread their rather one-sided vision of small-scale and artisanal mining as being a devastating activity, executed by violent immigrant miners, who lack respect towards their environment and the authorities, and live in chaotic social patterns. What is often forgotten is that the current activities are based on a historic process of extractive exploitation in the region that started at the beginning of the 1900s with the extraction of timber, rubber, nuts (*castaña*), later oil, and now gold and probably also soon bio-fuel plantations. This has always affected the jungle and caused the exclusion, dispossession and diminishing of its native communities and Amazon cultures, benefitting the colonists or capital groups involved in these activities. Based on these former experiences, alternative development strategies for the region are proposed, such as payment for ecosystem services, tourism, small-scale agroforestry systems, but also controlled and sustainable small-scale and artisanal gold mining. Before these alternatives offer room for the local population and the growing Andean migrants to “live well” in the area, a lot still has to change.

The situation of Madre de Dios fits well within the wider national context. According to the regular reports issued by the Ombudsman,⁶ civil unrest is most often caused by environmental problems, including mining and hydrocarbon extraction. In 2005, these activities made up 15 percent of the total amount of registered social unrest in the country and six years later they represent over 54.4 percent of all the reported social-environmental conflicts. In a recent report, the Ombudsman stated that out of 217 cases of civil unrest, most socio-environmental conflicts occurred in the departments of Puno (10) and Cajamarca (14).⁷ It is worth mentioning that the number of a department’s social and environmental conflicts roughly matches its position on the Poverty Map. This is true for Puno and Cajamarca, where poverty rates are 56 percent and 49.1 percent respectively.

Concluding Remarks

In Peru and in Madre de Dios specifically, small-scale and artisanal gold mining are expanding in terms of territory and population. The sustained rise of the gold price, poverty and the fact that gold is present in many of Peru's regions, are reasons that explain the 'boom'. Although the gold sector in Peru is led by formal, medium and large-scale gold mining operations, which produce most of the gold in the country (85 percent), in terms of people working in the sector, small-scale and artisanal mining are more important than large-scale mining. Until today, Madre de Dios is still the region with the highest number of people working in gold mining.

In the previous decade, the Peruvian government issued more policies to encourage international mining companies, and related national companies and capital groups, to invest in different types of large-scale mine exploitations in the country. The general idea was and continues to be that each environmental and social problem with large-scale mining can be paid off and compensated, but in practice many conflicts occur. At the same time, local groups and governments lack capacities, funds and vision to refute the presence of large-scale mines, as they needed the extra incomes and gifts of the companies. This enables more company influence, manipulation and corruption, often accompanied by biased mass media propaganda, claiming that modern large-scale mining is the only way towards development.

At the same time, the Peruvian government is promoting initiatives for formalizing small-scale miners, but in a rather disconnected and non-consistent way. Initiatives concern the Law for the Formalization and Promotion of Small-scale mining and Artisanal Mining from 2002 and the recently approved National Plan for Formalizing Artisanal Mining (2011). However, these initiatives have not resulted in major changes in the sector, since only a very small part of the mining population has been formalized up till now and social and environmental problems continue to exist. Recent developments have shown an increase in conflict, also in the Madre de Dios region. It shows a lack of good State governance and that real peoples consultation and dialogue is still far away.

There is also a clear connection between extractive developments and the degree of unrest in the country. In the case of medium and large-scale extraction this connection is well documented. In the case of small-scale mining however, it is hardly visible and barely studied. We will therefore continue our effort to study this complex but important topic.

Notes

- 1 Law N° 27651 “Formalization and Promotion of Small and Artisanal Mining”.
- 2 Systematized information from Villachica et al. (1995) and Kuramoto (2001 and 2003).
- 3 Information from the register of regional and national miners organizations and specialized bibliographic information.
- 4 Supreme Decree N° 013-2002, passed April 21, 2002.
- 5 testimony of small-scale miners in a GOMIAM meeting in Puerto Maldonado, August 23, 2012.
- 6 The Ombudsman is an autonomous agency, commissioned to protect the constitutional and fundamental rights of individuals and the community and see that the public administration fulfills its obligations and provides the public with services.
- 7 Monthly Civil Unrest Report No. 88, Ombudsman, 2011.

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SMALL-SCALE GOLD MINING AND CONFLICT IN SURINAME

MARIEKE HEEMSKERK AND CELINE DUIJVES

Introduction

This chapter is about small-scale gold mining and conflict in Suriname. Since the mid-1990s, small-scale gold mining has boomed in Suriname. With the skyrocketing price of gold this trend is not likely to reverse soon. An estimated twenty thousand people are working as small-scale gold miners in Suriname and at least a similar number are working in auxiliary activities as cooks, bar and hotel owners, transport providers, sex workers and other jobs. 65 to 75 Percent of the miners and mining service providers are international migrants, mostly Brazilians.¹ The remaining inhabitants of mining areas are primarily Suriname Maroons, tribal peoples of African descent, and a small number of Amerindians, who inhabit Suriname's forested interior. Conflicts over land and resources exist both among miners and between miners and others. In Suriname many conflicts revolve around the opposing interests of the migrant miners, most from Brazil, and the local population. This will be dealt with in future publications.² In this chapter we look at the causes of small-scale gold mining conflicts and the way they are managed, and concentrate on examples of conflicts in which Maroons are the key players.

Gold mining related conflicts reached the front pages of Suriname newspapers several times in 2011. We mention two. In May 2011, a rich gold deposit was discovered near the rural Maroon village of Klaaskreek (Rozenblad 2011). Soon numerous gold miners invaded the area. Tensions rose when Klaaskreek Maroons chased

away all non-Klaaskreek miners. They based their right to do so on their tribal rights to the lands surrounding the Klaaskreek community. With help of the police, the district government, and a community miners' organization the fighting parties were calmed down. Today only Klaaskreek villagers are working on this site, even though they have no legal mining title to this land. According to a mineral agreement between the government of Suriname and mining multinational Iamgold, the mine site is part of the exploration concession of the latter.

Just a month later, in June 2011, different interest groups started a fight about gold near the rural village of Maripaston, in the district of Para (Pross 2011a). This area was given out as a timber concession but because of the presence of gold, the concession holder allowed small-scale miners to mine on the concession against a percentage share of their earnings. Increasing numbers of miners and mining investors flocked to the area. These people included area residents, people from the capital city, and foreign gold miners. Villages in the area suffered from water pollution and complained that young girls were enticed to go dance in the mining areas rather than attend school. When conflicts about stakes among miners escalated, the district commissioner of Para called upon the police for help. The area has now become a gold mining concession of state mining company Grassalco. The Indigenous villagers of nearby Pikin Saron complain that the interests of the economic and political powerful dictate who obtain mining rights to this area (Pross 2011b).

These two examples characterize the small-scale gold mining sector in Suriname and form the point of departure of this chapter. The cases show, in the first place, that mining rights are a combination of legally issued concession rights, customary rights of tribal peoples, miners' systems of doing things, political power, and economic position. In this book section we will show that these different systems of defining access to land and resources often clash, thus creating conflict. We will also make the point that these conflicts seldom turn into violent fights. Instead, most conflicts are managed – albeit not entirely resolved – through negotiation.

The above cases show that the various stakeholder groups in small-scale gold mining are heterogeneous and internally divided. The “villagers of Klaaskreek” include village leaders with percentage-deals with Brazilian miners; village gold miners; village mothers concerned about the impact of mercury contamination on their children; and many more. It is our contention that mining-related conflicts can only be understood by unraveling the multiple, often contrasting roles and interests of the people and groups that are involved.

Another issue demonstrated by the above examples, is that the government of Suriname has largely followed a *laissez-faire* policy towards small-scale mining; as long as the various interest groups

were not creating too much fuss, they could do as they pleased. In 2011 the Commission Regulation Gold Sector (*Commissie Ordening Goudsector*) was installed with the mandate to change this situation and transform the small-scale gold mining sector into a formal economy sector, which is orderly structured, complies with the existing laws, and employs only legal and tax-paying residents of Suriname. This chapter exposes various challenges that the Commission is confronted with, including the lack of formal rights to land by indigenous and Maroon peoples in Suriname. In this chapter we will give a short overview of the history of small-scale gold mining in Suriname; we will describe the most common mining methods used; we will elaborate on the social context of the small-scale gold mining sector, and its relationship with large-scale mining. In the final paragraph on the legal and institutional context of small-scale gold mining we will argue that regulation of the sector remains a utopia as long as customary land and resource rights of tribal peoples are not legally recognized.

Small-scale gold mining in Suriname: history and present

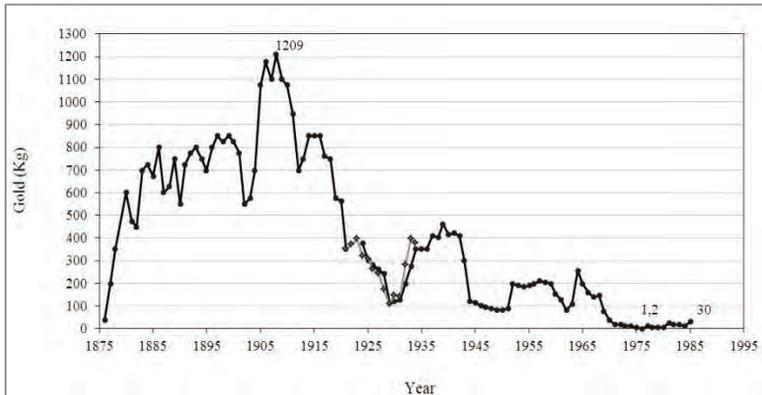
The first recorded official exploration for gold in Suriname occurred in 1718. It was followed by various private and State initiatives to explore and exploit Suriname's gold deposits (Heemskerk 2000). Efforts during the eighteenth century to find gold in the former Dutch colony were not successful though. In the late nineteenth century the Dutch colonial government began to stimulate gold mining. In 1874, an expedition to the Marowijne River produced positive results, and the first 14 concessions were granted. Between 1876 and 1879 some 187 new placers were discovered in Suriname and production rose from 38 kilos to 475 kilos; initiating a first gold rush (Healy and Heemskerk 2005).

Near the end of the nineteenth century mechanized mining was introduced, using steam pumps, bucket-line dredges and ore crushers. Production peaked at 1,209 kg in 1908. At that time over 5,000 workers worked in the gold fields, many of them from the Caribbean region. Insufficient prospecting, the acquisition of inappropriate equipment, and poor management soon meant the end for most mechanized operations (Healy and Heemskerk 2005). Figure 1 shows the dramatic increase in gold production between 1875 and 1908, as well as the subsequent decline.

When the formal, mechanized gold sector declined from 1915 onwards, a new system of leasing was introduced from British Guiana, known as porkknocking (Healy and Heemskerk 2005). Small-scale gold miners (porkknockers) worked as independents on the concessions of others, and in exchange paid between 10 to 15 percent

of their gains of to the concession holder. This system is still in place today.

Figure 1. Estimated historical gold production in Suriname (1875-1985)



Source: Heemskerk 2000.

Gold production reached a low in the 1950s and 1960s but in the 1970s, the price of gold started to rise. The Geology and Mining Department introduced gold dredging in the Marowijne River and during the 1980s gold production with dredges on the Marowijne and Lawa rivers increased further. These government activities abruptly ended when a civil conflict broke out between the then military government and Maroon insurgents, named the “Jungle Command”. This conflict, known as the “interior war” (*binnenlandse oorlog*; 1986-1992), has been a main driver behind the current gold rush (Heemskerk 2000).

During the interior war the communities in South-Eastern Suriname were isolated from the rest of the country and gold became virtually the only currency with which to buy supplies and equipment, including arms. Poverty increased throughout the country and since then the economic conditions of many people have not improved. In the period 1969-2000 the number of families and persons living below the national poverty line rose from respectively 22.6 percent and 28.8 percent to 52.4 percent and 59.2 percent³ (Government of Suriname 2001). This figure only includes people from Paramaribo. The figure is much higher in the country’s interior, but no data exist for this region. Many schools in the interior of the country closed down and some have not reopened since.

When the interior war ended in 1992 the gold fields became reasonably safe again for investors and the second gold boom got underway. As a result of the interior war, many young Maroons had not completed their education. Without a school diploma and poorly speaking Dutch, the national language, they were not considered for

formal jobs in the city. Small-scale gold mining offered an attractive way to earn an income for its low entree barriers in terms of education, skills, and capital. Maroons who could afford it or were able to take out a loan bought mining equipment.

Around the same time increasing numbers of Brazilian miners (*garimpeiros*), who were confronted with more stringent restrictions on *garimpagem* (small-scale gold mining) in their own country, moved into Suriname. Initially, *garimpeiros* crossed the border from neighboring French Guiana with small hydraulic pumps (1" and 2") that could be carried around.⁴ Once they had established themselves in an area, they switched to larger (4" and 6") and heavier machines. In order to obtain a spot to mine, the Brazilians had to strike a deal with Suriname mining title holders. Just like they were accustomed to in Brazil, the Brazilian machine owners paid a percentage-share of their profits to the Suriname concessionary. A similar system was introduced on the rivers, where in addition to Brazilians also Haitian and Guyanese migrant miners began to mine with larger and more modern machinery. The influence of the migrants on the gold mining techniques was big, as the modern mining techniques and working systems introduced by *garimpeiros* were soon adopted by Maroon miners.

Today, miners who work on land use 2, 4 and 6 inch hydraulic systems with heavy earthmoving equipment. *Garimpeiros* and Maroons dominate the small-scale gold mining sector but most concessions are in hands of the urban political and economic elite. These concessions include areas that Maroons traditionally consider as their tribal home lands, to which they claim customary rights. As illustrated in the introduction, differences in culturally and legally defined property regimes lead to tensions about the access rights of different user groups involved.

Small-scale gold mining methods in Suriname

The grand share of small-scale gold miners in Suriname works with hydraulic methods on land. Hydraulic gold miners work through several stages (Heemskerck and Van der Kooye 2003). 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 meters deep. The contents are washed with a *batea*; an open conical dish, often with a small central depression. If gold is encountered, a site is deemed suitable.

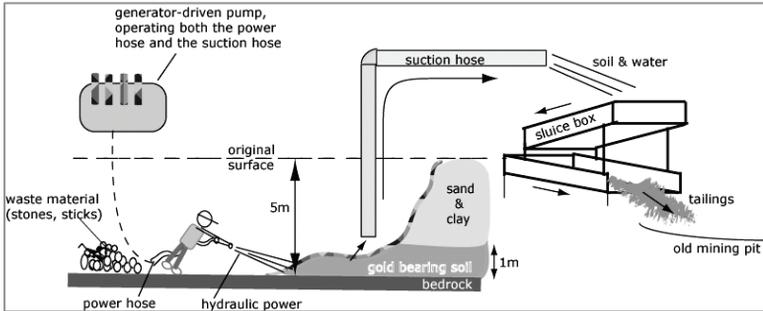
Figure 2. Overview of a mining area in the interior of Suriname, 2012



Photograph by M. Heemskerk.

After site selection, a forest area of about one hectare is cleared from trees and understory. A generator powered mining machine is placed at the prepared site, and drives two types of hoses. One or two power hoses divert high pressure water to first remove the top layer of sand and clay and later the gold bearing layer of soil. 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. Some operations use a similar system of mining on rafts in the river.

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 covered with leaves.

Figure 3. Terrestrial small-scale gold mining

Source: Heemskerk and Van der Kooye 2003.

Women may be the owner of a mining concession or a mining machine, but they are not found in the mining pit. The work is physically demanding and women as well as men in the area share the opinion that women do not have that type of strength. For a similar reason, young children are rarely observed in the mining pit. Teenage boys between 15 to 18 years can occasionally be found as workers in these systems, although most the mine operators prefer to have them do support jobs such as cooking, weeding, and other auxiliary services.

The described mining methods are used by professional, full-time miners. Part-time or occasional miners and youngsters who live near or in mining areas tend to use different, less intensive techniques. Some mine the rejects of professional gold miners' teams, using a long narrow sluice box to wash the material. They may use a small pump to wash the material, or just set up their installation behind the sluice box (local name: *daal*) of a larger, professional operation. Because professional miners are estimated to lose between 40 to 60 percent of the gold in the materials they mine in the mine tailings, mining the rejects of another operation may be profitable business, especially since the investment costs are small. This work often occurs in loosely assembled two to four person groups and is locally referred to as working *baka daal* (behind the sluice box) or *baka santi* (behind the mine tailings). After a day's work, the miners wash the contents of their small sluice, using similar methods as described above for the more technologically advanced operations.

One other mining method is panning or "turning the *batea*". The miner scoops soil in the gold pan or *batea* and adds water. With circular hand movements, the contents of the gold pan are made to spin around. Due to centrifugal forces, the waste materials flow over the edge of the gold pan and gold with other heavy soil particles being left in the center. Panning is not an easy job, and some people are admired for their particular skills in moving the *batea*. To further separate the gold from the concentrate, the miner will add a little mercury, and continue the separation process as described above.

Figure 4. Hydraulic mining by Suriname Maroons, 2012

Photograph by M. Heemskerk.

Because the gains of panning are very small as compared to those of hydraulic miners, different panners may combine their concentrates, and later divide the earnings equally or according to a prior agreed upon key. This is the method of choice for children because it is not physically demanding, does not require any capital inputs (apart from the gold pan), does not involve machinery and, in places where the mines are near the villages, they can go and come whenever they please. Adults rarely pan for gold (other than for prospecting) because of the low earnings.

Social context of the small-scale gold mining sector

East and Central Suriname, where most gold mining takes place, are among the most populated areas in the interior. Communities in this part of the country are mainly populated by Maroons. In addition, the region houses a smaller number of indigenous communities. About 50 villages of indigenous and tribal peoples are part of the Greenstone Belt; the geological formation where gold mining takes place. These communities house an estimated 10 to 15 thousand persons.

A significant share of the Maroon population in East and Central Suriname works as small-scale gold miners and as many Maroons are active in the mining service economy, selling goods and services to the miners. In addition, community members profit indirectly from the increased economic activity and money circulation in the villages. The indigenous peoples seldom work in small-scale gold

mining though there are exceptions, particularly in areas where their communities are located in rich gold bearing zones.

Small-scale gold mining has brought different new groups to the interior. Among them are urban citizens. A large share of the Maroon gold miners was not raised in the interior, but grew up in the marginalized neighborhoods of Paramaribo. Their Maroon background and family relations facilitate their entry into the gold fields. Many have not completed secondary education and are unemployed. They now take the opportunity to make a living in the blooming gold mining industry.

About five percent of workers in the small-scale gold sector are non-Maroon Surinamers from the city. For example, mining title holders or concessionaries are typically wealthy urban citizens of other ethnic groups (mostly Creole and Hindustani). Many mining title holders rarely enter the interior themselves. Instead they rely on a field manager for the management of their concession and the collection of fees from small-scale miners on the concession. Hindustani and Javanese men can be found working as excavator operators, either as independents or as part of a mining team. Creoles are relatively more likely to be working as mechanics or guards. Surinamese non-Maroon women are not found much in the mining areas, but there are exceptions. Also at least one woman from Paramaribo is a powerful concession holder. Other urban women can be found as sales women, sex workers, and other service providers.

An estimated 65 to 75 percent of the persons working in the gold fields of Suriname are migrants. They mostly originate from Brazil, typically from the poor Northeastern states. Some gold miners and mining service providers come from other countries such as Peru, Haiti, Guyana, China, the Dominican Republic, and Colombia. While there are migrants who come for just a few years, others have been in Suriname for more than 10 years. People from many different ethnic, cultural, and socioeconomic backgrounds work and live together in the gold fields. Far removed from the rules and regulations from their home communities, a new social system has evolved, with new unwritten laws and codes of behavior. These so-called 'miners' laws' have developed over many years and help minimize and resolve conflicts (Healy and Heemskerk 2005).

For example, Brazilian *garimpeiros* pay about 10 percent of their earnings to local tribal land claimants and/or a formal concession holder, even though there are no legal regulations that oblige the miner to do so. In Suriname, indigenous and tribal peoples do not have any formal property rights to the lands they inhabit. Furthermore, it is prohibited by law to sublet a concession to a third party. Nevertheless, Brazilian miners pay the requested fees to the formal or informal title holders because it provides them with a sense of legality and security (Heemskerk and Van der Kooye 2003; Theije

and Heemskerk 2009). The mining title holders obtain the fee because they are often not equipped to do the work themselves, and this way they earn good money from their formal or informal right to the land. Another example of regulations in the mining sector is the division of earnings. In a team working with a hydraulic machine without excavator, the equipment owner or 'boss' typically takes 70 percent of the earnings and the remaining 30 percent is shared equally among the workers. Even though the police and other law enforcement agents are located on a considerable distance from the mining fields, these informal laws are seldom contested or violated (Healy en Heemskerk 2005).

Small-scale and large-scale mining

With a per capita Gross National Income (GNI) of USD 7.297, Suriname may be considered a middle income country (Algemeen Bureau voor de Statistiek in Suriname 2012). For the past few decennia mining has been the cornerstone of Suriname's developing economy. The export of minerals - bauxite, oil, and gold- represents 95 percent of the exports of the country (IMF 2010). Large-scale mining for gold only started after the interior war.

In 1994 the Canadian exploration firm Golden Star Resources (GSR) acquired the exploration rights to the 17,000 hectare Gros Rosebel concession in Brokopondo District. The Maroon village of Nieuw Koffiekamp is located centrally in the company's exploitation concession (Heemskerk and Van der Kooye 2003). Several other villages, including Brownsweg, and local mining sites are located in the exploration concession.

In accordance with its mining agreement with the Suriname government, GSR expelled local small-scale miners because they "hindered the exploration activities of the company". Initially GSR wanted to remove the entire village because it was situated too close to the planned mine location. Villagers of Nieuw Koffiekamp refused relocation. They still experienced trauma of a previous relocation in 1965, when their historic villages were flooded to make place for a hydro-power dam. More informed than in the past and backed by human rights lawyers, Maroons – successfully - protested relocation.

In 1995, conflict escalated between Nieuw Koffiekamp and GSR, which was backed by the Suriname government (Van der Kooye 1997). 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. Villagers also said that these parties were firing life ammunition at them to keep them away. These

allegations have been substantiated by Suriname's main human rights organization.

Table 1. Total gold exports from Suriname

Year	Export small-scale miners	Export Iam Gold	Total gold exports	% official gold export by small-scale miners
	Kg	Kg	Kg	%
2002	1,702.24	No production	1,702.24	100.0
2003	11,710.65	No production	11,710.65	100.0
2004	12,705.38	No production	12,705.38	100.0
2005	11,655.16	10,917.32	22,572.48	51.6
2006	11,955.67	9,455.47	21,411.13	55.8
2007	13,833.52	7,962.49	21,796.01	63.5
2008	16,222.71	10,264.15	26,486.86	61.2
2009	16,486.61	12,099.25	28,585.86	57.7
2010	No data	13,290.00	–	–
2011	19,000.00	13,096.77	32,097.00	59.2

Source: Heemskerk 2010 & Iamgold 2012.

The conflict was never resolved but withered away in the late 1990s, when gold prices reached a low point and it became unprofitable for GSR to further invest in mine development. In 2001 recovery of gold prices motivated GSR to restart its activities and sell the concession. A mine was constructed, and production started in 2005. At present the Gros Rosebel mine is still the only gold producing large-scale mine in Suriname. This mine is for 95 percent property of multinational Iamgold (operating as Rosebel Gold Mines) and the remaining five percent is in hands of the Suriname government. In the period 2005-2009, gold exports by Rosebel Gold Mines have ranged from 7,962 kg (256 oz) to 12,099.25 kg (389 oz).

Tensions between Rosebel Gold Mines and small-scale miners from surrounding communities continue. Maroon miners from Brownsweeg village working in the Kriki Neygi mining area recently expressed their fear of being expelled by the company and losing both their investments and their job.

Critics of small-scale mining argue that large-scale mining brings more benefits to the national economy because the large-scale companies pay taxes and are easier to control. Small-scale gold miners only pay 1 percent royalty to the state whereas Rosebel Gold Mines pays 2.25 percent royalty. Now the price of gold has risen to more

than USD 425,- /troy ounce, Rosebel Gold Mines pays “Extraordinary Royalties” (*Buitengewone Royalty*) of 6,5 percent in money over the amount above this price (Government of Suriname 2003). In addition to royalties, the company pays other duties and taxes related to exploitation and daily operations such as concession duties, exploration rights, exploitation rights, income tax (*inkomstenbelasting*; 36 percent of net profit)⁵, and 25 percent tax on wages (*loonbelasting*) (Heemskerk 2010). In 2011, for example, the Suriname state earned 9.2 million USD in royalties and 6.7 million USD in license duties from the export of gold mined by small-scale gold miners (Pross 2012). In comparison, the state earned 146.4 million USD from the Iam Gold operation, which produced 31.1 percent less gold than small-scale miners.

The other side of the medal is that all gold produced by Rosebel Gold Mines is exported to Canada. A part of the earnings is reinvested in salaries and other operational expenses in Suriname, the other part stays abroad. Small-scale miners, by contrast, use their earnings for family subsistence, investment in their local operations (fuel, food for laborers and more), and entertainment in the mining areas. A study in 2009 showed that 90 percent of the families living in villages along the Tapanahoni, Lawa and Marowijne river and in the Brokopondo region are partly or wholly financially dependent on small-scale gold mining (Heemskerk 2009).

In 2002-2003, the Nieuw Koffiekamp conflict was replicated in the Nassau Mountains, where the Suriname Aluminum Company (SURALCO), a joint-venture between the state of Suriname and the US-based bauxite company ALCOA, had acquired a gold concession. The concession area overlaps with the traditional homelands and economic use zone of the Paramaka Maroons, who were not informed or consulted. The government forcefully removed local gold miners from the concession to keep them from interfering with the company’s exploration activities. As SURALCO joined forces with US mining giant Newmonth, the same area is currently the playing field of large-scale versus small-scale miners again.

In 2004, the consortium, which is operating under the name SURGOLD, started formal exploration activities. In April 2011, both local and migrant miners were expelled from the area. Whereas the newspapers reported the ‘voluntary’ leaving of the small-scale miners, Maroon miners from the area say they were confronted by “about a thousand heavily armed militaries” looking “as if they were going to war”.⁶ Other gold miners reported that the armed forces had taken funeral cars along, just in case...⁷

Maroon small-scale gold miners from the area are particularly upset because the current President had visited them during his election campaign. On that occasion he said, as local miners recalled: “When I become President, I will kick out all the white guys [the

multinational]]” and “Surinamese gold is for Surinamese people”. His party gained an overwhelming majority of votes in the region. One of the first things upon taking seat as a president was doing the exact opposite: closing a deal with the multinational and kicking out the locals.

As the local miners were asked to leave the SURGOLD exploration concession, they were promised another area to work and a road to get there. To date, the promised road has not been constructed and it is unclear whether the appointed area has gold. As in the case of Nieuw Koffiekamp, the Maroon people consider the fact that a concession had been given out to a multinational without proper consultation or compensation as offensive and a violation of tribal customary rights.

The director of the management team of the Commission Regulation Gold Sector explained that an 8,000 ha area has been reserved for local Paramacca⁸ Maroon gold miners. However, the Commission cannot hand over the area to the miners as long as they are divided and fail to establish one Paramacca miners’ interest group. The lack of unity and mutual trust was also observed by the research team during visits to this mining area. There are different interest groups, all claiming to speak for all Paramacca miners and all denouncing the other groups as not being the true representatives of the tribal gold miners. Recently some of the miners have returned to mine on the edges of the concession area.

The legal and institutional context of small-scale mining

Numerous cases suggest that conflicts in the Suriname mining fields start and intensify because of an inadequate legal system; corruption and nepotism within the institutional framework; and a general lack of national law enforcement in the interior. In this section we provide examples and explain their context.

When someone wants to get engaged in mining activities, this person needs to apply for a mining concession with the Geology and Mining Department. The concession holder has to comply with a number of administrative, financial, and other obligations, depending on the kind of concession. In reality, neither the government nor the concession holder follows the legal rules. A large share of the concessions should have been withdrawn simply because their time, as defined in the Mining Code, has expired. Secondly, only a few concessionaries comply with the reporting and financial requirements. Among those who do, the quality of the reports that are submitted is often questionable.

Other much ignored regulations include the prohibition to engage in commercial production on an exploration concession; the

prohibition to sublet a small-scale gold mining concession; and the obligation to file for permission prior to subletting a large-scale mining concession. Concessionaries are seldom corrected and concessions are not withdrawn for different reasons. These reasons include the financial and political power of some concessionaries and a lack of capacity and funds in the Geology and Mining Department.

In the 1990s, the concession granting system developed into a speculative system. A small elite group obtained as much mining titles as possible in the Greenstone Belt area. Many speculative title holders hope that one day, a large-scale gold mining company will show interest in the concession and is willing to pay a lot of money to acquire it. In the meantime, virtually all concession holders sublet their concession to small-scale gold miners who, in return, pay the title holder a share of their production.

The Suriname Mining Code dates from 1986, before the current gold rush started and before anyone could imagine the technological revolution in the small-scale gold mining sector and related socio-economic and environmental impacts. It was not foreseen that small-scale gold miners would be mining with fully automated draglines, 6"-hydraulic machines, and heavy earthmoving equipment. The advanced environmental, safety, labor, and administrative regulations that such mining requires have not been included in the current mining legislation (Healy and Heemskerk 2005).

Another shortcoming of the current Mining Code is that it fails to protect the customary rights of tribal peoples in the interior (Heemskerk 2009). The only clause referring to Indigenous Peoples and Maroons is Article 25b, which states that the concession application must include "a list of the communities of tribal peoples in and near the requested terrain" (Government of Suriname 1986: 16). This phrase does not provide any legal protection (see Koffiekamp). By contrast, the inhabitants of the mentioned communities are "obliged to allow the mining title holder to execute the activities for which the rights were granted on the defined terrains: (a) provided that they have been informed in advance ... and (b) against a compensation that has either been given or assured in advance" (Government of Suriname 1986: 32-33, Art. 47). The law further stipulates that the interests of "third parties must be reasonably taken into account" and "minimally violated". The terms "reasonable", "taking into account", and "minimally" have not been defined. In practice, even the above minimal requirements are often violated. Mining concessions are often granted on tribal lands without prior notification and compensation is typically insufficient or non-existent (Amazon Conservation Team Suriname 2005). In 2002 the Association of Geologists drafted a new Mining Legislation, which in many ways is an improvement over the 1986 Mining Code (version 16-10-2003). This Draft law is for

unknown reasons still awaiting discussion and approval in the National Assemblée.

A failing mining code is not the only factor to blame for inadequate mining policy. Another main issue is the lack of control on existing regulations, which are continuously violated. In the 1970s, Suriname's Geology and Mining Department was a regionally renowned institution which conducted geological exploration throughout the forested interior. Today it has turned into a sad example of the deterioration, underfunding, and mismanagement of public services. In addition, political interests are interfering with transparent mining policy.

The Commission Regulation Gold Sector was installed to improve the legal and institutional context of small-scale gold mining. The Commission started with the registration of gold miners and has expelled small-scale gold miners from areas where there were conflict situations, including the Newmont concession area. It plans to operate mining service centers in the interior, which should serve as one-stop-windows where miners can go for registration, administrative procedures related to mining titles, tax payment, technological assistance, and so forth. At the time of writing this chapter, it is not clear what the long-term results will be of these activities.

Conclusions: mining and conflict in Suriname

Many factors contribute to the incidence of conflict in the small-scale gold mining sector in Suriname. We have provided examples of conflicts between Maroons and other key-players, and mentioned the often conflicting legal and customary property regimes, mining multinationals taking over small-scale gold mining areas, a concession policy that does not take into account the living and user area of indigenous and tribal peoples, an inadequate legal framework, and insufficient enforcement of existing regulations. These various factors are interrelated and reinforce one another.

Nevertheless, in contrast to the popular understanding of Suriname's gold mining areas as a Wild West where the right of the strongest prevails, surprisingly few conflicts escalate or result in physical confrontations. Given the presence of locals and migrants with different cultural backgrounds, the circulation of large sums of money, contrasting views about what belongs to whom, and the virtual absence of law enforcement, one would expect much more frequent outbursts of violence. Generally, however, people in the mining areas live peacefully together thanks to customary law systems that have evolved over time. Occasionally, personal conflicts have resulted in shootings, but these incidents are exceptions. Most large

conflicts are resolved by negotiation with or without mediation by for example traditional authorities and/or local government authorities.

At present the Surinamese government intends to regulate the small-scale gold mining sector and bring it into the formal economy. Time will tell to what extent these efforts will help diminish or resolve conflicts between stakeholders.

Notes

- ¹ By March 2012, the Commission Regulation Gold sector (OGS), which is making an effort to register gold miners, had registered 3,827 Suriname nationals and 10,849 foreigners who either were working as laborers in the gold mining areas or owned mining equipment. The Commission OGS estimates that 40,000 persons are working in the gold mining areas, but it has not specified whether this number refers to gold miners only or also to people providing auxiliary services.
- ² See also de Theije 2007, de Theije and Heemskerk 2009, de Theije and Heemskerk 2010, de Theije and Bal 2010.
- ³ Poverty data from other years are not available.
- ⁴ Interview with B. Paansa, Geology and Mining Department, 15 October 2012.
- ⁵ The first few years of operations the company could write off its investments and, as a result, had no net profits.
- ⁶ Interview with gold miners at Meriam, May 2011.
- ⁷ Interview with gold miners at Meriam, August 2011.
- ⁸ Name of the Maroon tribe that claims the area among its customary usufruct lands.

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Small-scale gold mining increasingly causes environmental problems and socio-political conflicts in the Amazon. Uncontrolled use of mercury and deforestation threaten the livelihoods of the inhabitants of the forest, and the health of the miners and their families. Tensions arise when miners work in territories without licenses and governments have no control over the activities and the revenues generated. The scale of the problems has increased in the past few years due to the high price of gold and the introduction of more mechanized mining techniques. At the same time, the activity offers a livelihood opportunity to many hundreds of thousands of people.

In this book the Contributors give a situation analysis of small-scale gold mining in five countries in the wider Amazon region. This work comes from a base line study that is part of the GOMIAM project (Small-scale gold mining and social conflict in the Amazon: Comparing states, environments, local populations and miners in Bolivia, Brazil, Colombia, Peru and Suriname). GOMIAM develops a comparative understanding of socio-political and environmental conflicts related to small-scale gold mining in the Amazon. The chapters describe the different social, political and environmental situations in each country, including technical, economic, legal, historical, and policy aspects of the small-scale gold mining sector.

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ISBN 978-90-70280-18-5 / NUR 747

