



**UNITED NATIONS
ENVIRONMENT PROGRAMME**



**Analysis of formalization approaches in the artisanal and
small-scale gold mining sector based on experiences in
Ecuador, Mongolia, Peru, Tanzania and Uganda**

Ecuador Case Study

June 2012

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UNEP would like to thank the Government of Norway for their contribution to this work. A formalization analysis document of the artisanal and small-scale gold mining sector has been developed by UNEP to highlight critical elements of formalization process for policymakers.

Five case studies were developed as a means to inform the overall formalization analysis. The case studies are available on UNEP's web-site and were developed by the following regional experts:

- Ecuador – Maria Laura Barreto, ARM/MERG
- Mongolia – Patience Singo, Sustainable Artisanal Mining project (SAM project)
- Peru – Olinda Orozco Zevallos and Frederico Cesar Gamarra Chilmaza, Red Social (Peru)
- Tanzania – Samuel Spiegel, Independent Consultant
- Uganda – Jennifer Hinton, Independent Consultant

The case studies represent the views of the identified expert author. The case studies do not imply any expression of any opinion whatsoever on the part of UNEP or the country studied.

TABLE OF CONTENTS

1. Introduction	4
i. General characterization of ASGM in Ecuador	4
A. Overview of the sector	4
B. Current status of ASGM	5
ii. Short history of ASGM legalization processes in Ecuador	5
2. Mercury and other Environmental Impacts in ASGM	7
i. Brief assessment of mercury use and related environmental and social impacts	7
ii. National and international programs	8
3. Key Issues in the ASGM Legal Framework and Lessons Learned	9
i. Mining framework that applies to ASGM	9
A. Legal definition of ASGM, mining titles, and related obligations and rights	9
B. Requirements for mining titles attribution	10
C. Types of business entities to perform ASGM operations	11
D. Transfer of rights and mining titles upgrades	12
E. Negotiation and consultation with communities	12
F. Other relevant requirements: labour conditions and profit sharing	12
ii. Environmental legal framework	13
A. Environmental assessment instruments and environmental licences	13
B. Pollution control measures	14
C. Other relevant requirements	15
iii. Relationship between Small-Scale and Medium and Large-Scale Gold Mining	16
A. Legal framework to promote partnerships between ASGM and LSGM	16
B. Lessons learned from experience	16
4. Key Issues of Institutional Aspects and Lessons Learned	17
i. State function and initiatives in the formalization process	17
A. Ministries of Mining and Environment or corresponding executive government institutions	17
B. Distribution of responsibilities at the Provincial and Municipal levels	17
ii. Role of miners' organizations in the formalization process	18
iii. Role and major initiatives of academic, research, and technology centres	19
5. Economic Instruments in the Formalization of the ASGM Sector	19
i. Fiscal systems and their role in the gold production chain	20
A. Fiscal regimes, royalties, and fees	20
B. Commercialization requirements and taxes	20
ii. Role of credit mechanisms	21
iii. Role of ethical market initiatives and brief analysis of the current initiatives	21
6. Conclusions and Recommendations	22
A. General Summary	22
B. Legal Framework for Mining Titles	23
C. Environmental Licences	23
D. Relationship between Large and Small-scale Mining	24
E. Government and Institutional Structure	24
F. Economic Incentives	24
7. References	25
8. Bibliography	28

1. INTRODUCTION

i. General characterization of ASGM in Ecuador

A. Overview of the sector

Artisanal and Small-scale Gold Mining (ASGM) is one of the oldest and most traditional forms of mineral extraction in Ecuador. It emerged towards the end of the 1970s in Southern Ecuador's Portovelo-Zaruma area, as result of two factors: the rising international gold price and substantial unemployment caused by the bankruptcy of the Compañía Industrial Minera Asociada (CIMA) that had been active in the Portovelo-Zaruma gold district. This area had been explored and developed from 1904 until 1950 by the South American Development Company (SADCO), when SADCO's mining rights were transferred to CIMA.ⁱ In the 1970s, when CIMA went bankrupt, the miners fought to continue the mining operations. This new phenomenon generated a series of conflicts with government authorities who questioned the legality of the operations. Despite the conflicts, the miners organized into small groups and over the next 20 years, they produced roughly 42.5 tons of gold.ⁱⁱ

In the 1980s, artisanal and small-scale mining expanded to Nambija in the Amazon region and to Ponce Enriquez on the Southwestern flanks of the Andes. In Nambija the miners were organized into cooperatives (a product of the capital generated by mining, agriculture, and commercial activities). The cooperative became an important economic actor with the government and mining companies in the region. The gold rush in Nambija did not go very far because of the decline of the price of gold, but several of the most profitable ASGM operations continued their exploitation.

In the 1990s, a revealing change in the ASM sector occurred (particularly in primary deposit operations) that led to a gradual incorporation of economic planning, new processing technology, and investment in modern equipment and machinery. Cyanide replaced mercury as the primary processing agent for gold extraction with an important associated increase in rates of recovery. During this shift, the cooperatives, which were previously the only significant legal mining entity, became just one of several. These changes were financed by the miners themselves and with the support of national and international cooperation. Equally crucial in this shift was an unprecedented legal disposition that allowed for the legalization of all operations that existed on the date of promulgation of the new mining law in 1992.ⁱⁱⁱ

Notably, the same type of improvements did not occur in the placer gold or secondary gold deposits due to a combination of structural, economic, and cultural factors that are different in these operations.

From the late 1990s through the first decade of the 21st century there was a period of expansion in mining owing to favourable economic factors and a government strategy to promote the sector. The strategy was a success in terms of attracting capital and increasing activities, but the expansion brought with it an increase in environmental impacts and conflicts with communities, due in large part to a lack of capacity to monitor and enforce controls, and a lack of effective consultation with the affected communities.

This expansion and the conflicts experienced throughout the sector from large-scale to small-scale and artisanal operations resulted in an anti-mining sentiment in several parts of the population. In 2007, with the change in government and associated economic and political shifts, there was a halt to large and medium-scale mining activities for a period of 19 months until a new legal framework for mining which addressed environmental and social concerns was promulgated.^{iv}

B. Current status of ASGM

The role of artisanal and small scale mining in the overall economy of Ecuador is captured in a Mining, Metals and Sustainable Development (MMSD) initiative's analysis^v which noted that, "Small-scale mining is the most relevant activity in the country because of the quantity of material extracted and processed and because it constitutes a major part of the registered work force."

In 2005, ASGM was responsible for 75% of the 5 tons of national gold production. In 2007 total gold production dropped to 3.5 tons. This decrease likely is related to the political situation in the country which affected overall foreign investment in the private sector during 2007 and 2008.^{vi} It appears that this trend affected the LSM and not the ASGM sector, which means that in those years it is likely that the relative proportion of the total production from ASGM is much higher than the 75% estimate.^{vii}

Ecuador has 1,349 artisanal operations of which 1,069 are gold operations (see Figure 1).^{viii} In 2002, artisanal and small-scale gold mining generated 65% of the direct employment within the broader ASM sector in Ecuador (60,000 of 92,000 jobs).^{ix} Taking into consideration ASGM gold production



Figure 1: Primary ASGM regions in Ecuador

increases since 2002, it can be surmised that direct employment has increased accordingly and that 90,000 workers would be a conservative estimate for the ASGM sector today. Furthermore, the Communities and Small Scale Mining (CASM)^x initiative estimated that 4% of the population of Ecuador depends directly or indirectly on ASM activities, which would equate to about 2.7% of the population depending on ASGM – at least 400,000 people.

ii. Short history of ASGM legalization processes in Ecuador

The *Mine Promotion Law* of 1974 is possibly the first law to address clearly the legalization of ASGM in Ecuador. The law defines small-scale mining as activities undertaken by those who work mines where production does not exceed 1,500 tons per month of ore or 50 tons daily of

mineralized material for placer or alluvial deposits. The law was significant in its formal acknowledgement of ASGM activities and in that it attributed responsibility to the government to promote the sector through cooperatives.

The regime that applied to ASGM also applied to other mining activities. Small-scale operators were required to be registered under the Registry of Small Mining. In the case of independent gold panners,

however, there was no licence required to operate if the area was declared “free” (i.e., land formally designated for artisanal mining use).

The main drawback to this approach was that small-scale operations had the same obligations as other mining activities. Complex and expensive administrative requirements created an economic obstacle for many operations to become legalized and profitable. In the case of independent gold panners who had permission to work without a licence in reserved areas, this law did not stimulate significant improvements, such as the establishment of cooperatives, or gains related to health, security, or social responsibility. For these reasons, it appears that the law did not have much impact on the formation of cooperatives in the operations of secondary deposits (alluvial) as noted above.

The *Mining Law* of 1985 was a significant step backwards in the process of promoting ASGM in Ecuador because it was silent about small-scale mining yet maintained the concept of exploitation zones for independent gold panners. At that time Ecuador had an emergent ASGM sector that was now without any State recognition and without the potential to legalize the operations that were formed during the previous period.

The *Mining Law* of 1991 returned the definition of Artisanal and Small-scale Mining (ASM) but in this law ASGM does not have the status of an economic activity, rather it is considered a subsistence activity with no possibility of evolving. The Law describes ASM as “... individual or family work that undertakes mine work as a means of sustenance and is characterized by the use of rudimentary instruments, manual devices or simple portable machines, the use of which is authorized by the Mining Department.” The law decreed that this activity could only be carried out in riverbeds and beaches and other land where no other mining rights backed by titles existed.

The previous regulatory regime had created a vacuum that forced many newly formed ASM operations into a situation of illegality. The State recognized this and legalized the existing operations. Under this provision, the cooperatives that had previously attained legal status were able to make an automatic transition from illegality to concession-holders with the same rights and obligations and without any additional administrative or environmental requirements. Due to the attribution of equal rights and obligations the cooperatives could now migrate to other forms of legal entities such as companies and other types of societies. This process was reported to have had good economic, environmental, and social results for the operations that made the transformation.

While the move to legalize existing operations had a positive intent, it only affected those operations active when the Act was brought into effect. For new operations, the definition of ASM enshrined in the new Act poses a significant obstacle because it defines the sector in a restricted way as a subsistence activity that uses rudimentary instruments.

An interesting new approach to titles introduced in this law was that one mining title could be issued to several natural persons (referred to as a condominium). This applied to all mining title holders allowing, theoretically, groups of ASM miners to work together more efficiently under a single business entity.

The attribution of one type of mining title (with the same rights and obligations) to all mining activities, regardless of size, looks beneficial but in fact was not useful for the majority of ASGM operations. The most economically advanced and profitable ASGM operations benefited from it because they could pay the related costs. Many ASGM operations, however, could not meet their obligations related to payment of royalties, patents, technical reports, environmental studies, etc.^{xi} and thus lost their titles during this period.

Another phenomenon occurred with the legalization of ASGM activities. Their new legal status allowed many ASGM operators to enter into negotiations with national and foreign individuals and medium and large-scale mining companies regarding access to ASGM deposits. A few of these negotiations were successful, although the lack of guidelines generated some serious conflicts.

The *Law for the Promotion of Investment and Citizen Participation* (2000), amended the 1991 mining law and attempted to resolve the situation created by the absence of a small-scale mining definition by describing ASM as a mining operation:

... which, taking into consideration the areas of the concessions, the processing and production volume, levels of investment, capital and technological conditions, [can] be qualified as such in accord with the norms of the general regulation.^{xii}

The general regulations promulgated in 2001 completed the definition with the following conditions:

Small Scale Mining is considered as that affected by title holders of mining concessions that fall within the following parameters:

- a) Maximum concession area: 150 mining hectares
- b) Ore extracted in the concessions: up to 100 metric tons per day
- c) Total amount of investment in the concessions, up to one million United States dollars.
- d) Technical conditions that could be improved to increase ore recovery and reduce the environmental impact.^{xiii}

This definition of small gold mining (SGM) is clearer and more complete than the previous one but arguably is too detailed. The amount of daily production will naturally limit the amount of investment. Thus, adding investment parameters seems redundant and can impose unnecessary restrictions on the operator as well as adding additional parameters for the government to control.

2. MERCURY AND OTHER ENVIRONMENTAL IMPACTS IN ASGM

i. Brief assessment of mercury use and related environmental and social impacts

Ecuador experiences similar environmental and social impacts as do other countries that have ASGM. Most are caused by mercury and cyanide use in the processing of gold, as well as the sedimentation and related pollution associated with tailings mismanagement and alluvial extraction activities (especially in rivers and other watersheds). The resulting water contamination has a direct impact on the ecosystem but also on water use for other economic activities, and on the health of the population.

Like Brazil, Bolivia, and Venezuela, Ecuador is a major user of mercury in South America. In all these countries, major ASGM sites are located in the Amazon Basin.

In 1997, it was estimated that Ecuador emitted 20 to 50 tons of mercury to the environment. Because of the specifics of the mining process, about 30% of the mercury emitted by small-scale gold mining ends up in mine tailings as low-reactive elemental metallic mercury and about 70% of the total goes to the atmosphere as mercury vapour during the amalgam burning and gold purification processes.^{xiv}

Not surprisingly, the areas that have experienced the most ASGM impacts are where the sector has been most active over the years such as Portovelo-Zaruma, Ponce Enriquez and more recently Chinapintza and Nambija. For example in Portovelo-Zaruma, there are around 150 gold processing plants that discharge 20,000 tons of heavy metals to the aquatic system annually.^{xv}

Later studies show a range of health problems associated with mercury and cyanide exposure. A 2002 study detailed mercury intoxication symptoms and elevated blood-Hg levels in children in the gold mining settlements in Nambija and Portovelo. In the same study there was some indication that even children who had low blood-Hg levels (<10 microg/L) may be affected by exposure to sodium cyanide, which is used extensively in the local gold-mining operations.

Another study of the health and environmental effects of gold mining activities noted that mercury storage at home is a key risk factor evidenced by gastrointestinal complaints and an increasing incidence of elevated diastolic blood pressure and elevated mercury levels in hair.^{xvi}

National and international initiatives related to mercury and the process of legalization led to decreased mercury use in Ecuador in the 1990s.^{xvii} (More information on these initiatives is provided in the following section.) A significant part of this decrease can be attributed to the replacement of mercury amalgamation by cyanide processing. A combination of education, the use of retorts and *chanchas* (amalgamation cylinders that mill with mercury allowing for less manual manipulation of amalgam), and finally, a legalization process that provided some of the conditions necessary for miners to invest in environmental and social management improvements, have all played important roles in the process of mercury use reduction.

Miners have reported an 80% improvement in mercury recycling through the use of retorts and 90% elimination of the manual manipulation of amalgam. NGOs and consultants recognized that despite improvements some new problems have arisen with the growing use of cyanide (and the combined use of mercury and cyanide processes in some cases). Poor environmental management, in particular, tailings in effluents going into rivers, has resulted from very limited knowledge about the dangers of cyanide.

Legalization created conditions for the government to undertake monitoring and regulatory controls. Furthermore it allowed for government, NGO, and private sector initiatives to identify the operations that needed capacity building and the transfer of technology to improve the safe use of mercury and promote the transition to more sustainable practices.^{xviii}

Yet, mercury amalgamation is still widely used in Ecuador, especially in artisanal mining. This sector did not receive much attention in terms of technology transfer or legalization of their activities relative to the small-scale sector. Access to retorts that are durable, reliable, and compatible with the daily gold production is an important factor in achieving mercury use reduction.

ii. National and international programs

In the early 1990s several national and international projects in Ecuador contributed to a better understanding of mercury use problems in ASGM. The most important projects were: *Minimization of Mercury Emissions by Small Gold Mines in Southern Ecuador*, an SDC project,^{xix} and *Mining Development and Environmental Control Technical Assistance Project*, (PRODAMINCA project).^{xx} They promoted the transition from mercury to cyanide gold processing through the transfer of technology and building capacity, improved management of cyanide tailings dams, introduction of best practices in the use of mercury, and the use of devices such as retorts to avoid contamination as well as increasing the recycling of mercury, and other technical actions such as collective environmental impact assessment studies.

The projects were focused primarily on technical assistance to deal with environmental problems, especially those caused by the use of mercury. These projects addressed some social and economic issues in the ASGM sector but focused less on institutional, organizational, and legal issues. The most relevant social and economic actions promoted by the projects were economic and social ASGM assessments, meals for miners' children, improvement of potable water sources, arranging for garbage collection and disposal, promoting small industries as alternative sources of work, and in the area of occupational health and safety.

The most relevant national projects were by the Geological, Mining and Metallurgical Research and Development Corporation – CODIGEM, a technical institution associated with the Ministry of Energy and Mines, the Ecuadorian Institute of Mining – INEMIN and with the National Department of Geology – DINAGE. The main emphasis of these projects was on technical and environmental capacity building.

After 2000, other national private initiatives were established with the Association of Mining Engineers, the National Chamber of Small Mining, and the Latin American Institute for Social Investigation, ILDIS.

It is important to mention some other national and international initiatives such as: *Eradication of Child Labour in Artisanal Mining*, by ILO and USDOL (2002-2004); *Environmental and Health Impacts of Small-scale Gold Mining in Ecuador*, by IDRC (1999-2002)(2003-2005); *Institutions and Organizations in ASM*, IDRC/MPRI (2003); *Non-renewable Natural Resource Study, Monitoring and Control of Condor Mountain,s* by MacArthur Foundation (2002); and two small grants by CASM, *Prevention and Control of the Contamination in San Gerardo River* (2002), and *Environmental Management of the Biron River* (2002).

Significant recent activities related to mercury reduction were initiated through UNIDO's Global Mercury Project (GMP). Ecuador was involved in some specific studies under the GMP but was not subject to a comprehensive program.

3. KEY ISSUES IN THE ASGM LEGAL FRAMEWORK AND LESSONS LEARNED

i. Mining framework that applies to ASGM

In the new Ecuadorian Constitution of 2008, there is a strong mandate to promote economic sectors that generate employment, add value, and encourage locally produced goods. The Constitution includes the concept of a “grassroots solidarity economy”, comprised of micro, small, and medium-size production units that should be promoted and prioritized. Clearly, environmentally and socially responsible small and artisanal miners were important targets of this mandate.

Ecuador promulgated the current Mining Law in January of 2009 and the related general regulations in November 2009. In both acts there are specific chapters dedicated respectively to small-scale and artisanal mining activities. In the same period, Decree 120 was promulgated which defined the specific small and artisanal mining regime. This is the first time in Ecuador that, in an integrated way, a legal framework has addressed the artisanal and small mining sector.^{xxi}

The mining law declares that the “State shall establish promotional, technical assistance, training and financing mechanisms for the sustainable development of artisanal mining and small-scale mining. It shall also establish incentive systems for environmental protection and the generation of more efficient production units.”

Given the relatively recent promulgation of this framework, it is too early to be able to provide a detailed analysis of its impact on the sector. This preliminary analysis is based on feedback provided by miners' organizations and the Chamber of Small-scale Mining at a national forum held in Machala in early 2010. The review of the framework is based on international experience with related issues and approaches.

A. Legal definition of ASGM, mining titles, and related obligations and rights

The Mining Law distinguishes between artisanal and small-scale mining.

The approach of the Mining Law to small-scale mining is to consider it to be an economic activity that can contribute to the national economy, in particular to “promote full employment, eliminate under-employment and unemployment, and foster productivity and competitiveness and the accumulation of scientific and technological knowledge.” This Law provides the long-term vision that is crucial to inform national plans to move the small-scale gold mining (SGM) sector forward.

The Law's approach to artisanal mining is still to treat it as a subsistence activity, as noted above, creating potentially unhelpful restrictions on the sub-sector.

The Mining Law defines small-scale mining as those operations that have an operating exploitation and/or processing capacity of up to 300 metric tons per day. The mining title for this activity is a special small-scale mining concession. The same rules that apply to the concessions of medium and large-scale operations also apply to small-scale operations unless special provisions are defined. This principle can pose challenges for the SGM sector because the requirements for medium and large-size operations are complex and costly.

Small-scale mining concessions can be granted to “natural persons” and corporate entities and give the exclusive right to prospect, explore, exploit, process, smelt, refine and commercialize all mineral substances that may exist in the concession area.

Artisanal mining is defined as mining activities carried out by an individual, a family or an association characterized by the use of hand tools and simple and portable machines to obtain minerals, the sale of which covers only the basic needs of the person or family involved and does not require an investment of more than 150 basic unified salaries (US \$39,600).

In the case of an association of three or more artisanal miners, their investment can be no greater than the equivalent of 300 basic unified salaries (US \$79,200). The regulations should clarify whether this amount is payable monthly or annually.

The type of title granted for artisanal mining is a permit with a duration of 10 years, renewable for equal periods. Artisanal mining permit holders may only have one permit at a time and for only one determined location.

The differentiation between small and artisanal operations is a good step forward but more should be done to recognize the diverse types of ASGM businesses in the country and to provide opportunities to evolve from artisanal to micro and small-scale activities.

B. Requirements for mining titles attribution

The granting of small-scale mining concessions is made by a bidding process. Small-scale miners who apply for concessions of up to 300 mining hectares do not have to bid, although they are required to present a petition to obtain concessions. For concessions over 300 mining hectares (the maximum is 5000 mining hectares) public mining auctions and tenders are required.

In public auction and tender procedures to obtain concession titles under the special small-scale mining system, bids may only be presented by natural persons or corporate entities registered under the small-scale mining system.

The exclusion from bidding of those projects less than 300 mining hectares is a strategic decision, but any use of the bid system for any SGM still raises some questions concerning the following:

- A pre-condition of the bid system is that the government will invest in geologic surveys and studies to identify the most promising mining areas. Governments in developing countries have limited resources to invest in geologic data and do not tend to give priority to identification of areas for small-scale mining;
- Administration of the bid system tends to be centralized in large urban centres far from SGM operations;
- The level of detail required in the proposals tends to be very high (the objective being to compare and choose the best project). It will be difficult to achieve this level of detail in SGM for technical reasons and the costs associated with the process;
- Administering the bidding system can be costly for the government because of the number of potential candidates in one bid and because of the number of bids that must be organized to meet the demand.

The ASM regulation stipulates that due to the special nature of small-scale mining activities, exploration and exploitation work may be carried out in the same area simultaneously. Concessionaires are exempt from the requirement to sign exploitation contracts, although they are required to present annual production declarations. These two dispositions take into account the reality of SGM and simplify the process for the attribution of mining titles appropriately.

Concessions for small-scale operations which are not included in the bid system appear to have the same general conditions and administrative requirements as large-scale operations (for example, the concession title duration is 25 years and can be renewed). The exception is that small-scale operators do not need to sign a mining contract with the government to perform mining-related activities.

To acquire a permit for artisanal mining activity, the miner must present the following documents:

- a) Written request to the Mining Ministry indicating the location, the coordinates of the area, and the method of exploitation, in the corresponding form;
- b) In the same application, a sworn declaration regarding the materials to be exploited, investment amounts, production volumes, and additional information that verifies their classification as an artisanal miner;
- c) Identification of the plant and refinery where the exploited materials shall be processed; and,
- d) Sole Register of Taxpayers (RUC) and certificate of compliance with tax obligations.

This disposition tends to simplify the requirements though it depends how specific the information must be, for example, the investment amount or the technical and environmental details of the processing plant and refinery. For a “subsistence” sector that only uses hand tools and simple and portable machines it is unrealistic to expect an investment in such detailed plans or processing plants, unless the beneficiation plan refers to the kind of traditional installations used in AGM with some environmental improvements, for example the use of retorts.

Both artisanal and small-scale gold mining operations must be registered as such in a special registry. Applicants must present information regarding the area, the technology employed, and the investment. Registration also requires a certificate of approval of the special programs for technical assistance, environmental management, mining safety training, and professional training held by the Mining Ministry. For small-scale mining registry applicants there is an additional requirement for attendance at, and approval of, the training programs promoted by the National Research Institute of Geology, Mining and Metallurgy.

While there is real value in the registry as part of the formalization process, the requirement for a certificate of approval for special programs and attendance at training programs for small-scale mining can create some obstacles for the legalization process, due to the lack of government capacity to organize and implement these kinds of capacity-building courses in a timely and practical manner.

This concern has been expressed by several miners’ organizations which, in a national forum organized by the ESPOL University, Ministry of Non-renewable Resources, and Alliance for Responsible Mining (ARM) in 2010,^{xxii} clearly identified these requirements as significant obstacles to legalization.

C. Types of business entities to perform ASGM operations

Artisanal mining permits are granted only to “natural persons”, although this natural person can be organized into family groups, low income and “popular solidarity economy groups”, and self-managed groups.

Under the small-scale mining regime mining rights are granted to individuals, legally constituted co-operatives, condominiums (a group of individuals), associations, and other corporate forms whose

objective is to carry out mining activities in this sector. Associations are actively promoted, however, it is not obvious what the incentive for association is, especially in the case of artisanal mining.

The Mining Law maintained the concept of condominium (a single licence for multiple adjoining areas) from the previous legal framework. It is not clear whether the main purpose is to stimulate the partnership between individuals within artisanal mining activities (as was the original concept) or whether it is intended for use in small-scale mining as well, because there are restrictions on companies being part of a condominium.

D. Transfer of rights and mining titles upgrades

Small-scale mining concession holders, individuals, or corporate entities may assign and transfer their mining rights in whole or in part. The transfer must be authorized by the Mining Regulation and Control Agency and registered in the respective mining registry. Deeds of assignment and transfers of mining rights made by co-operatives, associations, or condominiums must have the express authorization of the majority of the members. However, it appears that the transfer of rights (total or partial) is not allowed in the case of artisanal mining. This limitation can constitute a disincentive for any improvement of the activity.

The rights and process for a mining title owner to upgrade from artisanal mining permit to small-scale mining concession are not obvious. There is a disposition that allows the government to substitute the permit system for the concession system in specific cases as a measure of public policy. Additionally, the Mining Authority can re-classify a small-scale operation as an artisanal one and vice-versa if they are not meeting their respective requirements. In this sense there seems to be some flexibility within the regulation for upgrading, however the responsibility to do so resides with the government; the procedures for a title owner to propose the title upgrade are not entirely clear.

E. Negotiation and consultation with communities

Procedures and rules for ASGM concerning social management and community participation are subject to the general regime that applies to all mining activities. There is a need to elaborate further on specific procedures and consultation guidelines that will be relevant for the particularities of artisanal and small-scale mining, as the capacity and approach will differ significantly from those of large-scale projects.

F. Other relevant requirements: labour conditions and profit sharing

The Mining Law states that it is prohibited to have children or adolescents working in any capacity in any mining activity. All forms of informal employment in mining activities are strictly prohibited. Notwithstanding the need for controls on child labour, the question of imposing corporate employment models on ASGM is complex and may be worthy of further investigation and elaboration to address the specific conditions, limitations, and needs of the sector.

The legal framework requires the government to prepare and implement social security plans and programs applicable to the special small-scale mining and artisanal mining regime.

Workers involved in small-scale mining must receive a 10% share of the profits and an additional 5% shall be paid to the State. The funds are to be assigned to social investment projects in the area where the mining project is located. This disposition is similar to those for medium or large-scale mining (and comes from a Constitutional disposition), the only difference being the percentage of the distribution (3% for workers and 12% for the government).

The financial implications of profit distribution will depend on how profits are calculated. In the context of small-scale mining this requirement may not be realistic given limitations on resources, methods of association, and accounting realities.

ii. Environmental legal framework

The Constitution of the Republic of Ecuador establishes several principles regarding the inalienability of non-renewable natural resources, the eradication of poverty, promotion of sustainable development, equitable redistribution of resources, and protection of the natural and cultural heritage of the country.

The right of people to live in a healthy and ecologically balanced environment that guarantees sustainability and a good livelihood is a Constitutional right. The Constitution declares that, “in both the public and private sectors, the State shall promote the use of environmentally clean technologies and non-contaminating, low-impact alternative energies. Energy sovereignty shall not be achieved at the expense of food sovereignty, and shall not affect the right to water...”

The present regulatory regime includes the Environmental Management Law of 2004, which created the environmental system in Ecuador, as well as the Mining Law and related General Regulations with several chapters dedicated to environmental provisions for mining projects. The specific regulations for ASM are defined in the Environmental Mining Regulation with concrete environmental obligations.^{xxiii}

The regulation for ASM defines the following principles and responsibilities of the Ministry of Environment in terms of the creation of specific management tools, instruments, plans, and systems:

- Provide practical tools to deal with mining environmental management and define the systems and processes applicable to ASGM operations;
- Create an adjustment and adaptation system to enable mining operations to adapt to the current environmental legislation. Promoting dissemination and training processes, both for the development of environmental impact studies and specific and simplified management plans in order to obtain the environmental licensing;
- Promote the development of special environmental management programs so that the environmental impact studies and corresponding management plans may be applicable in the simultaneous exploration-exploitation and beneficiation or processing phases;
- Establish a system for the management of socio-environmental conflicts with competent state entities;
- Develop a process for the promotion of clean technologies for small-scale mining and artisanal mining with the mining ministry, together with the industry ministry and the small-scale mining and artisanal mining sector;
- Co-operatives, associations, condominiums or small businesses must develop internal auditing processes of compliance or progress in the application of internal regulations and the legislation applicable to their mining activities, with the aim of adopting internal preventative or corrective measures. Guidelines should be provided for internal audits.

These principles, as part of the environmental legal framework, display an understanding that regulation must take into account the specific realities of this sector. It is, however, only partially regulated and implemented at the present time and needs further development towards specific regulatory measures and policies to fully realize the potential benefits for the sector and its stakeholders.

A. Environmental assessment instruments and environmental licences

Artisanal mining operations must obtain an environmental information sheet (*ficha ambiental*) to operate in the area of the permit. The authorization of these environmental information sheets is automatically renewed every semester, following payment of the fees.

Small-scale mining concession holders must obtain an environmental licence for their simultaneous exploitation and exploration operations, beneficiation or processing, and commercialization. The

environmental licence has an annual cost equivalent to two basic unified salaries (approximately US \$528).

The environmental studies include the specific and simplified management plans for small-scale mining, the content of which is determined by the appropriate regulation. The legislation creates the possibility of joint management plans in the environmental impact studies, with specific attribution of responsibilities for activities and outcomes. This can allow for cooperation and coordination among adjacent operations, however the relationship between these joint management plans and the mining titles is not clear. This issue should be clarified to avoid creating confusion around liabilities under a joint management arrangement.

The law clearly assigns joint responsibility related to environmental and safety regulations for all those working on a small-scale concession.

B. Pollution control measures

The environmental regulations specifically address a range of concerns related to ASGM, in addition to cyanide and mercury controls, that are important to highlight.

Legal measures to control the use of mercury

The Mining Environmental Regulations contain specific regulatory measures and a set of comprehensive environmental standards. Two principles guide the regulation of mercury:

- Avoidance of the use of mercury in gold operations and adoption of procedures to accomplish this;
- Avoidance of direct contact between workers and mercury.

The environmental regulations include guidelines for the use of mercury in ASGM operations requiring:

- Use of amalgamation cylinders;
- Use of mercury re-activators to ensure the recovery of mercury for reuse;
- Use of retorts;
- Use of personal protective equipment to carry out this process;
- Careful storage of mercury in hermetically sealed containers to prevent leakage;
- Prohibition of direct use of mercury in mills, gutters, or dredgers;
- Effluents produced in the amalgamation phase to be collected and stored in impermeable reservoirs, which, upon the closure of operations, must be rehabilitated in accordance with the provisions of the environmental impact studies.

Ecuador's limited emission standards for mercury contamination date from 1989. More current and comprehensive standards that address not only drinking water, but also air, soils, and other areas of concern, are vitally important to provide producers with more specific information and direction in the handling of mercury.

Cyanide standards and other control measures

As with mercury, limited emission standards for cyanide contamination, also dating from 1989, exist in Ecuador. Again there is a need for guidelines to provide producers with more specific information and direction in its handling. The risks associated with cyanide management were recognized by large companies, resulting in a voluntary Cyanide Code, developed with UNEP and ICME, designed for large-scale operations.^{xxiv} A parallel set of guidelines, relevant to small-scale operations, is needed. Consideration should be given to making these guidelines part of the regulatory requirements in order to protect operators, communities, and the environment.

Explosives

The use of explosives is important, especially for the extraction process in hard rock deposits. The environmental regulation states that the Mining Ministry shall regulate their use and develop a program for handling explosives, including technical assistance, in the ASGM sector. This provision in the law is important and valuable in terms of building capacity and achieving safety objectives. If well implemented, this program will be a significant addition to the sector.

Closure of mining operations

Mine closure and rehabilitation is an obligation for all mining concession holders, and increasingly recognized as a component of responsible planning practices to prevent future site contamination. An environmental management plan is required for closure and rehabilitation of operations that are partially or totally abandoned^{xxv} after exploitation, beneficiation, and smelting or refining activities.

These requirements are relatively new for the ASGM sector. The main problem for artisanal miners is that the requirements are based on a post-closure assessment. Also, it appears that there is no requirement or guidance for any prevention tools, like a simplified plan of rehabilitation, nor guidelines with simple techniques to prevent costly rehabilitation requirements.

An interesting approach to rehabilitation of mining sites in Ecuador can be seen in the granting of the right to beneficiate, smelt, refine or sell any abandoned mining or metallurgical residues. This right may be granted along with the rights to the mining concession holder over the other mineral substances that may exist within the boundaries of the concession as part of the overall mineral value of the property.

The intent of this provision of the law is that small-scale mining operations can become self-sustaining combinations of environmental clean-up and gold recovery projects in the concession area. These projects must be approved by relevant authorities, are often supported by international technical cooperation, and must follow various detailed technical assessment and monitoring requirements within a management plan.

The precautions for this kind of work are warranted, given the potential health and environment risks associated with remediation work. The challenge in this case is that the cost and complexity associated with the studies and the appropriate safety measures may be beyond many small-scale operators, which underscores the need for technical assistance and support, whether provided by international or national institutions. This is clearly an area that would benefit from an economic incentives and technical support program.

C. Other relevant requirements

There are a number of additional environmental authorizations required by artisanal and small-scale operations. While all these requirements are important they could be managed more efficiently with an integrated environmental licence that would be easier to administer for the government and the miners alike.

Authorization of mineral beneficiation (processing) plants

Small-scale mining operations are limited to operating mineral beneficiation plants, constituted exclusively for crushing and grinding, with an installed capacity of 10 tons per day and beneficiation plants that include crushing, grinding, flotation and/or cyanidation with a minimum installed capacity of 50 tons per day.

Individuals or companies, even if they are concessionaires, must apply for the respective environmental licence to install and operate these plants. The administrative requirements to obtain

this environmental licence, not yet detailed in regulations, will be important determinants in their success.

Water authorization and treatment

Small and artisanal operations must obtain a water authorization, following the same requirements as other mining activities. For reasons of scale, and access to capital and expertise, this requirement can constitute a real obstacle for ASGM.

Health and Safety

The environmental regulation defines a general principle that mining rights holders have an obligation to protect the mental and physical health and life of their technical personnel and workers.

How this principle translates into Occupational Health and Safety Regulations and related plans for artisanal and small-scale mining will greatly affect its implementation and effectiveness. In this area there is a critical need for guidelines and safety regulations specific to the realities of ASGM. Relatively simple initiatives can have a significant impact on the objective of improving worker health and safety.

iii. Relationship between Small-Scale and Medium and Large-Scale Gold Mining

A. Legal framework to promote partnerships between ASGM and LSGM

The key principle that guides the relationship between ASGM and medium or large-scale mining operations is the respect for mining titles. The legal framework contains dispositions to regulate simultaneous mining activities in a concession, but only with the authorization of the concession holder and under the umbrella of an operational contract.

The operational contract must follow the instructions of the Mining Ministry, be signed as a public document, and registered in the Mining Registry. The contract should highlight the need for compliance with environmental and mining rules that apply to the concessionaire. It defines the need for provisions regarding socio-environmental responsibility, state participation, labour practices, taxation, mining safety, as well as mediation and arbitration issues.

To reach the intended objective of a balanced, accountable relationship for both parties, it would be useful if the government provided a model contract or a guideline to follow in negotiating the operational contract. Without these tools it can be very difficult to achieve a successful outcome.

What is not very clear in the present framework is whether there is the ability to have associations between ASGM and LSGM that are not based on an operator contract but rather on other types of partnerships such as consortiums or joint ventures, for example. This is also related to the promotion of partnerships between small-scale mining concession holders and artisanal mining permit holders.

B. Lessons learned from experience

Conflicts between ASM and medium and large-scale mining are rooted in the 1980s when there was a government policy to promote medium and large-scale mining, ignoring the small-scale mining sector despite its significant presence in the economy. These conflicts were partially resolved in the 1990s by measures to legalize all ASGM operations.

Nevertheless, new conflicts emerged during the 1990s. A key problem was that there were no specific procedures to manage the emerging market for the transfer of mining rights and to guide negotiations between small and large mining companies. The lessons that can be learned from the positive cases^{xxvi} and negative cases^{xxvii} show that success (or lack thereof) was based largely on the will of the companies to negotiate with ASGM and the negotiation experience of the ASGM actors.^{xxviii} The fact

that these were the dominant issues highlights the lack of standards to guide this unbalanced relationship between ASGM and LSGM, along with the lack of legal criteria and clear processes to prevent problems and resolve new conflicts.

Currently, for a variety of legal and economic reasons, there is a resurgence of interest on the part of large-scale operations in traditionally artisanal and small-scale mining areas. Tools to anticipate and avoid many conflicts exist within the legal framework, but it will depend on the capacity and the commitment of the government to implement programs and enforce standards in a balanced manner. Furthermore, it will be important to elaborate (from the small-scale miners' perspective) guidelines for cooperation and interaction between small and large-scale operations, such as those developed by the International Council of Mining and Metals.

4. KEY ISSUES OF INSTITUTIONAL ASPECTS AND LESSONS LEARNED

i. State function and initiatives in the formalization process

A. Ministries of Mining and Environment or corresponding executive government institutions

It is clear that the government is committed to addressing the different dimensions of ASGM and the role of the government has expanded significantly since the promulgation of the ASGM regime. It will be important to create the necessary government capacity in terms of financial and human resources, and better institutional conditions, such as dedicated departments or directorates to deal with ASGM, not only in the Ministry of Mining but in the Ministries of Environment, Science and Technology, Social Security, and others that have a direct role in ASGM, will need to be cultivated. (See Table 1.)

B. Distribution of responsibilities at the Provincial and Municipal levels

The new Ecuadorian Constitution defines decentralization as a guiding principle yet it clearly advocates national responsibility for the management of the mining sector. The Constitution grants the central administration exclusive responsibility for mineral resources and natural resources including biodiversity, forests, and water. The Mining Law and General Regulation reinforce central responsibility through the management of mining titles and environmental licences. The provincial governments have the responsibility for environmental management within the province, and the municipalities have some environmental duties but this is far from a fully decentralized administrative structure.

The new legal regime for distribution of mining (and oil) royalties and profit sharing promotes decentralization of the distribution of these government revenues which can have a very interesting effect on the building of infrastructure and associated capacities at the municipal and local levels.

Decentralization is not a new phenomenon in Ecuador. In 1997, the Law of Decentralization of the State and Social Participation was promulgated and in 2001 the National Plan of Decentralization came into effect. The idea was that all responsibilities of the state should be decentralized except national defence and security, foreign affairs policy, economic and fiscal policies and the management of the external deficit.

Management of mining and environmental issues faced several challenges related to lack of resources and technical capacities in assuming new functions during the decentralization process.^{xxix} Nevertheless, there were several important and useful initiatives. For example, in 1999 local environmental management committees were created that included municipal authorities and civil society (including miners) to address issues related to the prevention and control of pollution.

Table 1: Summary of the Main Government Institutions Involved in ASGM Formalization

Institution	Responsibilities
Constitution	<ul style="list-style-type: none"> Promote the development of small-scale and artisanal mining, and promote its legalization in a way that guarantees technically adequate, socially just, and environmentally responsible conditions
The Ministry of Non-renewable Resources (Vice Minister of Mines)	<ul style="list-style-type: none"> Responsible for the management of public policy in mining areas and the issuance of associated agreements and administrative resolutions including the management of public policy for ASGM National Strategic Plan for the Sustainable Development of Small-Scale Mining and Artisanal Mining National Education and Training Plan (capacity building in technical, economic, social, environmental areas) Technical assistance regarding production control, available reserves, quality of the mineral, mining techniques, exploitation methods, ventilation, drainage, maintenance and industrial safety underground and on the surface, etc. No special department to deal with ASGM
Mining Regulation and Control Agency	<ul style="list-style-type: none"> Technical and administrative body responsible for exercising the State's power to monitor, audit, intervene, and control the various phases of mining activity Establish a system for the management of socio-environmental conflicts that may arise in the ASGM sector, adopting clearly defined processes and procedures for application. No special department to deal with ASGM Technically, economically, and financially independent from Ministry
National Institute of Geological, Mining and Metallurgical Research	<ul style="list-style-type: none"> Research, technological development and innovation activities in Geology, Mining, and Metallurgy Technically, economically, and financially independent from Ministry
Ministry of Science and Technology	<ul style="list-style-type: none"> Coordinate the Technical Assistance program <ul style="list-style-type: none"> Promote integrated management of sustainable mining development, mineral processing, operation and maintenance of tailings, storage systems, the closure of mining activities and the development of clean technologies Institutional, organizational, and technological strengthening of institutions responsible for the management and control of the ASGM sector
National Financial Corporation Development Bank State Bank	<ul style="list-style-type: none"> Implement funding plans in order to promote and provide training in the small-scale mining and artisanal mining sectors
The Ministry of Environment	<ul style="list-style-type: none"> Defining, creating, and controlling the implementation of the public environmental management system of the country, including the artisanal and small-scale mining sector

ii. Role of miners' organizations in the formalization process

At present, the main miners' advocacy group is the National Chamber of Small-Scale Mining of Ecuador (Cámara Nacional de la Pequeña Minería del Ecuador), which represents the small-scale

mining sector. This association includes the mining title owners (small-scale mining concessionaires) but not the workers. The aim is to promote the strengthening of entrepreneurship.

Ecuador has two other kinds of mining organizations – the national (Cámara Nacional de Minería del Ecuador) and the provincial chambers (Cámaras Provinciales de Minería) in the Oro, Guayas, Azuay, Loja, and Zamora regions. These groups represent the interests of the medium and large-scale mining sectors (including the national and international mining companies) but not ASM. The creation of the National and Provincial Mining Chambers only occurred in the late 1990s and around the same time other organizations were formed to defend the interests of the mine workers, including FERPEMA, The National Federation of the Austro and Regional Federation of Miners of Ecuador and later FENAMINE, National Federation of Miners of Ecuador, in 1996.^{xxx}

Ecuador has an interesting history in terms of the role of regional and national cooperative federations that defended the interests of ASGM in the 1980s, culminating in the promulgation of legal dispositions in the early 1990s allowing the legalization of ASGM operations. Recognizing the legal status of ASGM has a potentially important impact in promoting legal organizations for production and for defending the interests of ASGM. It also speeds up the process of generating more democratic structures for the miners at the bottom of the organizational pyramid (by avoiding informal monopolies and exploitation of workers).

iii. Role and major initiatives of academic, research, and technology centres

In the 1990s, there were a number of ASGM initiatives (mentioned above) that focused on mercury and cyanide processing and related technical assistance in minimizing their environmental and safety impacts, which were supported by international cooperation with the important involvement of national and regional universities, research centres, and institutes. These initiatives resulted in some significant internal research capacity (e.g., Escuela Superior del Litoral, ESPOL, Guayaquil; Escuela Politécnica Nacional, Quito; Universidad técnica privada de Loja; Escola de Minas, Universidad de Ecuador; Centro Ecuatoriano de Derecho Ambiental; Catholic University, and others).

However, this capacity did not transform into long-term ASGM research programs or curricula in the universities or research centres. The capacity building occurred in some areas, such as environmental and mining engineering, but less so in the areas of law, economics, administration, or business.

The new legal framework addresses the important role of universities, polytechnic schools, research centres, and institutes in capacity building and assistance to ASM which can range from the development of new technical and environmental tools to innovations with the aim of improving the management of ASGM operations. The framework recognized that the universities and polytechnics can be important partners in ASGM audits, evaluations, and reporting and that agreements should be put in place between the government agencies and the universities.

Several foundations and non-governmental organizations developed programs in support of ASGM and were partners in some of the national and international initiatives cited above, such as: Fundación CENDA (Centro de Desarrollo Comunitario y Conservación Ambiental); Fundación Salud Ambiente y Desarrollo; Fundación Arco Iris; and Fundación Natura. The participation of these civil society groups represents an important internal capacity and contribution to ASGM reform.

5. ECONOMIC INSTRUMENTS IN THE FORMALIZATION OF THE ASGM SECTOR

Although it is yet to be executed, the new legal framework encourages economic incentives as a tool to improve practices. The regime^{xxxi} defines the following principle:

The encouragement and incentives contemplated in the legal and regulatory provisions applicable to the special small-scale and artisanal mining regime shall benefit

titleholders in a progressive manner, in return for the implementation of good practices, which they shall demonstrate have been implemented...

The intention is to motivate compliance with the law while avoiding additional enforcement (which represents costs for both parties). If the economic incentives come with a series of administrative requirements (and associated costs), those costs can reduce the efficacy and defeat the purpose of the incentives.

i. Fiscal systems and their role in the gold production chain

A. Fiscal regimes, royalties, and fees

In Ecuador, the medium and large-scale mining sector pays 25% income tax, 12% tax on profits, 70% windfall tax, and 12% VAT.

The small-scale mining sector must pay 5% tax on profits (as noted above). The revenues collected are to be used exclusively for social investment projects related to health, education, and housing in the area where the mining project is located. It appears that the 5% profit tax does not apply to artisanal mining, and until regulations are promulgated, it is unclear whether ASGM must pay income, windfall, or value-added taxes or if they are exempt from these taxes also.

In addition, holders of small-mining concessions must pay 3% of royalties based on sales of the primary and secondary minerals. The price is calculated upon international market standards and must be paid on a biannual basis. In terms of distribution, 60% is allocated to local production and sustainable development projects through municipal governments or, when applicable, 50% to indigenous community entities and/or territorial districts. Artisanal miners are not required to pay royalties.

Small-scale mining concessions pay a one-time mining concession application fee equivalent to two minimum salaries (US \$528).^{xxxii}

Small-scale mining operations pay an annual conservation patent equivalent to US \$2-\$10 per mining hectare, depending on the phase of mining (initial exploration, advanced exploration, or exploitation). However, in the case of small-scale mining, the attribution of the concession is for all phases of the mining cycle and the activities can occur simultaneously. This means that it may be difficult to determine the appropriate level and cost of conservation patents.

It is difficult to evaluate the total amount of taxes for artisanal and small-scale mining because of the lack of clarity of the tax policy on specific items. However, the opinion of several ASM organizations, including the Chamber of ASM (expressed in a national forum organized in Machala in early 2010), is that the tax levels are too high, particularly for the small-scale mining sector.^{xxxiii}

B. Commercialization requirements and taxes

The principle embodied in the legal framework is that operators have the right to commercialize (i.e., sell and/or manufacture) the minerals from their individual production within or outside of the country, independent of the concession titleholder. The current regulations appear to be an attempt to blend market liberalization policies with more traditional attempts to control illegal trade.

The commercialization of minerals may be done by companies or individuals (concessionaires or not) who are legally authorized with a trade licence registered with the Mining Regulation and Control Agency. Those individuals or corporate entities that engage in the domestic commercialization of artisanal jewellery do not require this licence.

The obligations of traders are to:

- a. Become withholding agents, subjecting themselves to the tax legislation in force;
- b. Prepare detailed statements, recording all of the retentions and deductions made; and,
- c. Send monthly reports to the Mining Ministry regarding the origin, volume, and value of their purchases; the destination, volume and value of the sales; the retentions made and any other statistical information that may be required by the Mining Ministry.

It is considered illegal for:

- a. Mining concession holders to trade domestically or export metallic minerals originating from other concessions without a trade licence;
- b. Mining producers to sell metallic minerals to people or entities not authorized to commercialize them.

Complying with these regulations may not be a problem for most small-scale mining operators but for the artisanal sector and for the workers in small-scale operations (who are often paid in gold) it may be a problem, in particular if they need to obtain a licence to be able to commercialize the gold that they receive as payment for labour. It also can be a problem for the government to issue thousands of these licences.

ii. Role of credit mechanisms

ASGM in Ecuador has been considered a high-risk sector without clear legal rights and with a lack of transparency in the commercialization of gold. This situation may have contributed to the lack of formal credit initiatives to finance ASGM activities. The lack of information on mineral reserves or accounting data and the non-payment of taxes were also pointed to as contributors to the lack of formal credit mechanisms.

This does not mean that the sector does not have informal systems to finance the activity through individual and family savings or informal private credit. The problem with this informal type of support is that the financial capacity to improve ASGM operations is very slow. Also, unregulated credit schemes can lead to abuses and exploitation, centralization of power in small groups of people, money laundering from illegal activities, and the growth of organized crime.

With the new legal framework there are more conditions than ever to realize market value for operations, especially for SGM, because concessions are for 25 years, can be renewed, can comprise an area of up to 5000 mining hectares, can be transferred, and associations are promoted. These basic conditions (regardless of data on the mineral potential of the area) can provide market value to SGM operations and create the conditions required to generate interest from the formal private financial sector and to develop specific credit programs for SGM. With this in mind, the government should consider initiating financial support through a development bank to promote small credit initiatives to improve the operations.

The artisanal gold mining sub-sector would benefit most from government credit initiatives because it is at the bottom of the ASGM pyramid, the sub-sector that most needs, but is most unlikely to have, private credit initiatives.

iii. Role of ethical market initiatives and brief analysis of the current initiatives

The artisanal and small-scale mining legal regime states that the Ministry shall promote the development of production chains, fair trade practices and socio-environmental certifications for mineral products that are exploited and processed by artisanal and small-scale miners in the country so as to secure better trade conditions and to add value to such mineral products.

In addition, the country has been building the ASGM sector since the 1990s and the small-scale mining sector in particular has achieved a significant level of organization, legalization, and

environmental and social management. It is also important to note that ethical initiatives, in achieving the required certifiable operational standards, often promote capacity building.

Furthermore, the present government has a mandate to promote ASGM and to understand the potential of this sector to contribute to the development of the country. The specific ASM regulatory regimes it has created to support this sector can play an important role in promoting new ASGM operations and improving the existing ones. As a result, Ecuador has very good conditions to enter into ethical gold market initiatives.

Since 2004, the Alliance for Responsible Mining (ARM) has been working with nine pilot projects distributed across Latin America, with the objective of preparing them for certification. In 2004, Ecuador was chosen to be one of the pioneer countries to enter ARM's gold certification initiative.

The unit that was selected was the Bella Rica gold mine cooperative, COMIMACH, based in the canton of Ponce Enriquez, province of Azuay, Southern Ecuador. It processes an average of 300 metric tons of ore monthly, producing approximately 896g of gold monthly. The Bella Rica Cooperative includes a mine and a processing plant, which also offers processing services to third parties. COMIMACH began its Fairtrade and Fairmined certification process at the end of 2010 and it is still underway.

The main achievements of the COMIMACH operation include:

- setting up a quality control and traceability system on concentrates and gold;
- promoting the standards and principles of Fairtrade and Fairmined Gold among its associates and workers;
- training workers on the safe management of toxic elements throughout the processing plant;
- increasing gold recovery while reducing waste and establishing procedures to deal with solid waste and effluents, using bioremediation to treat cyanidation tailings which are safely stored and detoxified in an impermeable impoundment;
- improvements in efficiencies of the whole mine and processing plant; and
- formalizing all commercial operations and all migrant temporary workers.^{xxxiv}

To obtain the certification and use it as leverage for economic, technical, social and environmental improvements is the responsibility of the producer organization, but the legal environment in which the ASGM operates can contribute or inhibit the certification process. The enabling conditions include:

- the legal framework allows for the formal, legal recognition of the operation;
- royalties are set at an appropriate level (if too high there is often a situation of “fiscal informality”, i.e. not actually paying required taxes);
- the producer can export the gold, and the tax is set at a competitive level for export.

6. CONCLUSIONS AND RECOMMENDATIONS

A. General Summary

The advanced status of small-scale mining in Ecuador is a product of a number of favourable regulatory dispositions, international cooperation support, and national acceptance of the sector. Another factor that may have played an important role is that Ecuador never had a significant medium and large-scale mining sector. The absence of these influences allowed ASGM to get the necessary internal support to be considered an important economic activity in its own right.

Although structural conditions played a crucial role, it is important to acknowledge that the sector took advantage of all opportunities and showed leadership in moments when conditions were not

favourable for ASGM legalization. It was able, through various organizations, to defend its interests to the point where there is now a substantial national small-scale mining economy in which the majority of the players are gold mining operations.

Since 2009, a comprehensive national approach to ASGM was developed through public policy and a regulatory framework. The current national approach is designed to address poverty in the country and to support economic sectors like ASM that promote employment and address some of the development problems of the rural areas of Ecuador.

In terms of general observations, one very interesting aspect is that Ecuador has a specific regulatory framework for artisanal and small-scale mining but has also tried to integrate artisanal and small-scale mining as part of the overall mining sector regulation – the Mining Law, General Mining Regulations, and Environmental Mining Regulations.

This approach supports recognition and legitimacy for ASGM. All mining title-holders are recognized and regulated in terms of their relationships and these provisions can enable “good neighbour” behaviour. This integrated approach also creates the opportunity for partnership among the different operations and allows flexibility for development that reflects the diversity and complexity of the geology and the economic reality of the country.

B. Legal Framework for Mining Titles

The new legal framework is recent and therefore it is difficult to evaluate the impact it will have, but it is possible to identify the main strengths and some areas of concern based on previous experiences in Ecuador and lessons learned from similar experiences internationally.

While the objective is clear and valuable, further work is needed to clarify the particular legal framework of obligations and responsibilities of ASGM titleholders. It may be important to analyze and discuss the following points:

- Having at least two or three categories of mining titles for each sub-ASGM sector to help deal with the diversity of organization, financing, and technical knowledge across the sector;
- Ensuring that the administrative and operational requirements to obtain the mining titles are appropriate to the capacity of mining operations to accomplish them;
- Clarifying the procedures related to allocation of responsibilities under conditions of association and partnership among different concession and permit holders;
- Reviewing the definition of artisanal mining as a subsistence activity and allowing some forms of legal entities to become permit-holders;
- Reviewing the efficacy of the concession bid system for small-scale mining;
- Examining the potentially negative impact of making the permit for the artisanal mining sector non-transferable and considering the possibility of renewing the permit after 10 years;
- Clarifying the approach to dealing with illegal or informal employment in the ASGM sector to ensure its relevance to particular labour models;
- Developing guidelines for the consultation process related to ASGM;
- Reviewing and clarifying approaches to profit-sharing.

C. Environmental Licences

It is clear that there are still many challenges in terms of environmental management with an emphasis on cyanide and mercury, but also sedimentation and the treatment of tailings and contaminated mining waste. No less important are the challenges of social issues, especially related to health, security, and economic stability. In terms of environmental licences, the legal framework

includes an approach that seeks to simplify the procedures for both artisanal and small-scale mining, promote joint instruments, and give clear guidelines in the use of mercury. Additional work that could benefit this framework includes:

- Preparing guidelines about mine closure for both sub-sectors;
- Considering further development of guidelines for mercury use;
- Developing specific legal guidelines for the use of cyanide similar to those for mercury;
- Developing guidelines for occupational health and safety regulations;
- Creating economic incentives and technical support to promote the rehabilitation of old contaminated mining sites.

D. Relationship between Large and Small-scale Mining

In terms of the relationship between large-scale mining operations and ASGM, the framework is designed to promote formal recognition and cooperation amongst mining titleholders. The legal framework creates incentives that promote partnership between ASGM operations and large-scale mining operations through contracts of operation. Clarity in the following areas could help refine current incentives:

- Understanding whether a pre-existing artisanal permit holder has the right to continue when a small, medium, or large-scale company has interests in undertaking activities in the same area;
- Consider allowing other forms of partnership (in addition to condominiums and cooperatives), such as joint ventures and consortia;
- Generate guidelines and contract models for the potential partnerships, including clarifying the rights and obligations related to ASGM activities in the partnership.

E. Government and Institutional Structure

The present legal framework defines the responsibilities of the government in the management of mining and environmental licences for ASGM operations. The fact that the actual framework is comprehensive generates a series of new obligations for the different governmental agencies directly responsible for the management of the ASGM sector. Given these new obligations, consideration could be given to the following ideas:

- Creating departments dedicated to the ASGM sector in different Ministries including within the Ministry of Non-renewable Resources;
- Clarifying responsibilities of the different levels of the government in the decentralization process;
- Clarifying the system, process, and approach for monitoring of ASGM activities, including the funding for monitoring activities.

F. Economic Incentives

Economic incentives were not a practice in the previous regulatory system for ASGM, which explains the lack of initiatives related to ASGM-specific financial or credit support. The economic incentive aspects of the policy would benefit from the following:

- Preparation of a review of the economic contribution of the ASGM sector in regards to taxes, fees, and royalties. The establishment of different categories of artisanal and small-scale mining may assist in implementing a workable system – consideration should be given to a progressive tax structure that is sensitive to different economic realities within the sector, and allows for growth;

- Development of a credit system can support ASGM activities and promote environmental improvements;
- Clarification about barriers to commercialization and to the development of an approach to address smuggling, including inter-regional actions regarding harmonization of royalties and export taxation.

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^{viii} Recently the Ministry of Non Renewable Resources finished the Artisanal Census providing a detailed analysis of the sector. Unfortunately, the publication is not yet available but it is possible to find some preliminary information on the website of the Ministry, <http://www.mrnrr.gob.ec/>

^{ix} Sandoval (2001).

^x For more information about CASM and Ecuadorean data see <http://www.artisanalmining.org/>

^{xi} Sandoval (2001).

^{xii} Sandoval (2001).

^{xiii} Sandoval (2001).

^{xiv} Lacerda, Luiz Drude de. (2003). Updating global Hg emissions from small-scale gold mining and assessing its environmental impacts. *Environmental Geology*, 43, 308-314.

^{xv} Betancourt, Oscar, Narvaez, Alberto, and Roulet, Marc. (2006). Small-scale gold mining in the Puyango River Basin, Southern Ecuador: A study of environmental impacts and human exposures. *Epidemiology*, 17(6), S432-S433 ISEE/ISEA. The article identified occupational exposure to mercury and some mercury contamination nearby the processing plants, but the contamination by mercury in the target group was not confirmed. However the lead levels in the target population were very high and there is a suspicion that this lead may have come from other sources including the use of lead in pottery.

^{xvi} Counter, S.A., Buchanan, L.H., & Ortega, F. (2006). Neurocognitive screening of mercury-exposed children of Andean gold miners. *International Journal of Occupational and Environmental Health: Official Journal of the International Commission on Occupational Health*, 12(3), 209-214.

Counter, S.A., Buchanan, L.H., Ortega, F., & Laurell, G. (2002). Elevated blood mercury and neurological observations in children of the Ecuadorian gold mines. *Journal of Toxicology and Environmental Health. Part A*, 65(2), 149-163.

^{xvii} Velasquez, Patricio C. (2007). Technical report. United Nations Industrial Development Organization, Vienna, May 2007. Retrieved from http://www.globalmercuryproject.org/documents/non_country%20specific/Cyanide%20and%20Hg%20Colon%20Velasquez%20report%20to%20UNIDO%20FINAL.pdf

^{xviii} A comprehensive set of interviews was documented in regard to the mercury situation and improvements in Ecuador in: Lovitz, Sara Beth. *Scales of responsible gold mining: Overcoming barriers to cleaner artisanal mining in southern Ecuador*. A Thesis Presented to the Faculty of the Graduate College of the University of Vermont for the Degree of Master of Science, May, 2006.

^{xix} (1993-2000 – a two phase project) with the Swiss Agency for Development and Cooperation (SDC), along with the State Secretary of the Environment in the Ministry of Energy and Mines and Fundacion CENDA.

^{xx} PRODAMINCA project (1995 to 2002) with the World Bank, British DFID, and Swedish International Development Agency (SIDA) along with Ecuadorian Ministry of Energy and Mines. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2002/02/09/000094946_02012504030340/Rendered/PDF/multi0page.pdf

^{xxi} Tobar & Bustamante. (2010). Compilation of Ecuadorian Mining laws. (English and Spanish versions). Ecuador mining laws can be found also at http://www.mrnrr.gob.ec/index.php?option=com_docman&task=cat_view&gid=189&Itemid=48&lang=en

^{xxii} Memoria Del Foro: Las Políticas Públicas Para La Minería Artesanal y A Pequeña Escala Responsable. Alianza por la Minería Responsable (ARM); Cooperativa de Producción Minera Aurífera “Bella Rica”, con el aval del Ministerio de Recursos Naturales No Renovables y el auspicio de la Escuela Superior Politécnica del Litoral (ESPOL). Cámara de Comercio de Machala, 26 de marzo de 2010.

^{xxiii} Tobar & Bustamante (2010).

^{xxiv} See <http://www.cyanidecode.org/>

^{xxv} Mineral and metallurgical residues are considered to be abandoned when: a) They are from an extinguished mining concession; b) They are from a beneficiation or smelting plant, the authorization for which has expired or which has not been in operation for a period of two years, and, c) When it is not possible to determine their ownership.

^{xxvi} The positive cases involved:

- ODIN and Miners from San Gerardo and Pinglio
- IAMGOLD and miners from Zaruma-Portovelo and
- PROMINEC and Miners from Ponce.

^{xxvii} The negative cases involved:

- MINPALCA and Miners from Ponce Enriquez and Gabi
- GRIVIPANDOS and Nambija Miners.

^{xxviii} Sandoval (2001).

^{xxix} Taller “Descentralización de la gestión ambiental en proyectos apoyados por Fundación MacArthur (sic) en América Latina y el Caribe”. (2007). Experiencias de Gestión Ambiental Local para la Conservación de la Cordillera Del Cóndor, En los Andes Tropicales del Sur del Ecuador. Bariloche, Octubre de 2007. Retrieved from <http://www.ibcperu.org/doc/isis/8947.pdf>

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^{xxx} Ruiz, Ruth Elena, Armendariz, Xavier, León, Carlos, Valdiviezo, Daniel y Bustamante, Luis. (2004). *Proyecto Investigación en Red Sobre Organización e Institucionalidad de la Minería a Pequeña Escala y Artesanal. Informe Final*. Instituto Internacional de Investigaciones para el Desarrollo - IDRC - Fundación Natura Y Fundación Arco Iris. Marzo de 2004.

Sandoval (2001).

^{xxxi} Tobar & Bustamante (2010).

^{xxxii} The minimum salary changes regularly.

^{xxxiii} Memoria Del Foro: Las Políticas Públicas Para La Minería Artesanal Y A Pequeña Escala Responsable. Alianza por la Minería Responsable (ARM); Cooperativa de Producción Minera Aurífera “Bella Rica”, con el aval del Ministerio de Recursos Naturales No Renovables y el auspicio de la Escuela Superior Politécnica del Litoral (ESPOL). Cámara de Comercio de Machala, 26 de marzo de 2010

^{xxxiv} The ARM website has more information about this cooperative, www.communitymining.org

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