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ENVIRONMENT PROGRAMME

**Analysis for stakeholders on formalization
in the artisanal and small-scale gold mining sector
based on experiences in
Latin America, Africa, and Asia
“UNEP Paragraph 29 study”**

Ecuador Case Study

– DRAFT FOR COMMENTS –

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UNEP Chemicals

11-13, chemin des Anémones

CH-1219 Châtelaine, Geneva

Switzerland

Phone: +41 22 917 1234

E-mail: mercury@unep.org

UNEP Chemicals is part of UNEP's Division of Technology, Industry and Economics (DTIE)

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Authors

UNEP expresses its appreciation to those who contributed to this study, and especially thanks the principal authors below for their dedication and commitment.

Members of the Steering Group

Brenda Koekkoek (UNEP)

Ludovic Bernaudat (UNIDO and Global Mercury Partnership)

Patrick Schein (Alliance for Responsible Mining – ARM)

Susan Keane (Global Mercury Partnership)

Samuel Spiegel (Independent consultant)

Maria Laura Barreto (Project coordinator, ARM/Materials Efficiency Research Group (MERG), and

Usman Tariq (UNEP)

The organization responsible for the development of this report was the Alliance for Responsible Mining (ARM).

The execution of the work, including the coordination of the case studies was the responsibility of Maria Laura Barreto, in partnership with ARM and MERG.

The five case studies were developed by regional experts:

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

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1. Generic Characterization of ASGM in the Country

A. History

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 1970's 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 was 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 1970's, when CIMA became bankrupt, the miners fought to continue the mining operations. This new phenomenon generated a series of conflicts with government authorities that questioned the legality of the operations. Despite the conflicts, the miners organized into small groups and over the next 20 years, they subsequently produced roughly 42.5 tonnes of gold.ⁱⁱ

In the 1980's, 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.

It was in the 1990's that a revealing change in the ASM sector occurred (particularly in the primary deposit operations) that led to a gradual incorporation of economic planning, new processing technology, modern equipment and machinery. The use of cyanide replaced mercury as the primary processing method for gold with an important associated increase in rates of recovery. During this shift, the cooperatives, which were previously the only significant legal entity, became just one of several different types of legal mining entities. These changes were financed by the miners themselves and through important 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 kinds of operations.

The late 1990s and first decade of the 21st century was a period of expansion in mining as a result of favourable economic factors and the government's strategy to promote the sector. While it was a success in terms of attracting capital and increasing activities, this 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 on the sector and the lack of effective consultation with affected communities.

This expansion and the conflicts applied throughout the sector from large scale to small-scale and artisanal operations and 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 halt to large and medium-scale mining activities for period of 19 months until the government promulgated the new legal framework for mining to address the environmental and social concerns.^{iv}

B. Current Status of ASGM

The role of artisanal and small scale mining in the overall economy of Ecuador is captured in the Mining, Metals and Sustainable Development (MMSD) initiative's analysis of Ecuador^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 percent of the 5 tonnes of national gold production. Gold production dropped in 2007 to 3.5 tonnes. This decrease is likely related with the political situation in the country that affected the overall foreign investments in the private sector during 2007 and 2008.^{vi} It appears that this trend did not affect the ASGM sector, which means that in 2007 and 2008 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 and of these, 1,069 are gold operations. The provinces with the most operations are Azuay, El Oro, Loja and Zamora^{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 the ASGM gold production increases since 2002, we can conclude that direct employment has increased accordingly and that 90,000 people would be a very 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 depend directly or indirectly on ASM activities, equating to about 2.7% of the population depending on ASGM – or at least 400,000 people.



Map 1: Primary ASGM regions in Ecuador

C. Short history of ASGM legalization processes

The *Mine Promotion Law* from 1974 is possibly the first law that clearly addresses the legalization of ASGM in Ecuador. The law defines small mining as activities undertaken by those that work mines where production does not exceed 1,500 tonnes per month of ore or 50 tonnes daily of mineralized material for placer or alluvial deposits. The importance of the law was in its formal acknowledgement of ASGM activities and that it attributed clear responsibilities to the government to promote the sector through cooperatives. The regime that applied to ASGM was the same as other mining activities. The small-scale operators were also required to be registered under the Registry of Small Mining. In the case of independent gold panners, however, there was no license required to operate if the area was declared 'free' (i.e. land formally designated for artisanal mining use).

Clearly, the main obstacle of this approach was the fact that small-scale operations were given the same obligations as other mining activities. The complex and expensive administrative requirements created a real economic obstacle for many operations to become legalized and profitable.

In the case of independent gold panners where there was permission to work without any license in reserved areas this law did not stimulate any significant improvements, such as the establishment of cooperatives or anything related to gains in health, security or social responsibility.

For these reasons, it appears that the law did not have much impact in the formation of cooperatives in the operations of secondary deposits (alluvial) as noted above in the overview of the sector.

The *Mining Law* of 1985 was a significant step backwards in the process of promoting ASGM in Ecuador because the law was silent about small-scale mining but 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 but rather is considered a subsistence activity without the possibility to evolve. The Law describes ASM as "... individual or family work that affects 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 exist.

The state recognized that the previous regulatory regime had created a vacuum that forced many newly formed ASM operations into a situation of illegality and that this situation should be repaired. The approach was the introduction of the concept that the State would recognize the existing situation and legalize the operations that existed up to the date that the law was passed.

Under this provision, the cooperatives that had previously attained legal status were now able to make the 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 a very good economic, environmental and social impact for the operations that made the transformation.

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

Another interesting new approach to titles was introduced in this law was the idea that one mining title could be issued to several natural persons (referred to as a condominium). That figure was not created for just ASM but for all mining titles holders. This would, theoretically, allow for groups of ASM miners to work together more efficiently under a single business entity.

The attribution of the one type of mining title (with the same rights and obligations) for all mining activities regardless of whether they are large, medium or small, looks beneficial but in fact was not useful for the majority of ASGM operations.

The ASGM operations that can benefit from it are those that are most economically advanced and profitable ones because that can pay for all the costs related with the attribution and requirements of such a mining title. Many ASGM operations, however, could not meet their obligations related with payment of royalties, patents, technical reports, environmental studies, etc.^{xi} and therefore lost their titles during this period.

An interesting phenomenon occurred with the legalization of ASGM activities. With the new legal status, many ASGM operators entered into negotiations with national and foreign individuals, medium and large scale mining companies regarding access to the ASGM deposits. Some of these initiatives were successful but the lack of guidelines generated serious conflicts in some cases. For more detail see section 5 on the relationship between ASM and larger mining companies.

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

“... that which, taking into consideration the areas of the concessions, the processing and production volume, levels of investment, capital and technological conditions, be qualified as such in accord with the norms of the general regulation. “

Further, 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.”

This definition is definitely more complete and gives more clarity as to what is small gold mining (SGM) than the previous one but it arguably went a bit too far in the details. The amount of

daily production will naturally limit the amount of investment. Adding investment parameters seems redundant and can impose unnecessary restrictions to the operator as well as adding an additional parameter for the government to control.

2. Mercury and other Environmental Impacts in ASGM

A. Brief assessment of mercury use and other environmental and social impacts

In terms of environmental and social impacts of the activity, Ecuador is not very different from the other countries that have ASGM. The main environmental and social impacts 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 in the ecosystem but also on the use of water for some other economic activities and on the health of 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 around 20 to 50 tonnes 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.^{xii}

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 annually discharge 20,000 tons of heavy metals to the aquatic system.^{xiii}

Further 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 in children that 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 on health and the environmental effects of gold mining activities noted that mercury storage at home is a key risk factor. The study also found gastrointestinal complaints and an increasing incidence of elevated diastolic blood pressure with elevated total mercury levels in hair.^{xiv}

As result of international and national initiatives related with mercury and the process of legalization that occurred in the 1990s, Ecuador decreased its mercury use^{xv} (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. An important part of the process of reduction has also been a combination of education and the use of retorts and *chanchas* (amalgamation cylinders where they mill with mercury and which allows for decreases in the manual manipulation of amalgam) and finally, the legalization process that has provided some of the conditions necessary for the miners to invest in environmental and social management improvements.

The legalization of the operations also gave the government the conditions 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 use of mercury and promote the transition to more sustainable practices.^{xvi}

The miners are the most optimistic in terms of the changes in mercury use that occurred in Ecuador, reporting 80% of improvements in recycling mercury through use of retorts and 90% elimination of the manual manipulation of amalgam. NGOs and consultants recognized that there have been some improvements but that there are still many problems and that new problems have arisen with the growing using of cyanide (and the combined use of mercury and cyanide processes in some cases) because of poor environmental management, in particular, tailings in effluents and into rivers as a result of very limited knowledge about the dangers of cyanide.

It is clear that there are still many challenges in terms of reducing mercury use because mercury amalgamation is still widely used in Ecuador especially in artisanal mining. This sector did not receive the same 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 are important limitations to mercury reduction.

B. National and international initiatives

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*, a COSUDE project^{xvii} and *Mining Development and Environmental Control Technical Assistance Project*, a PRODAMINCA project^{xviii}. They promoted the transition from mercury to cyanide gold processing through the transfer of technology and building capacity, improved management of cyanide tailings dams, introduced best practices in the use of mercury and the use of devices such as retorts to avoid contamination as well as increased the recycling of mercury along with other technical actions such as collective environmental impact assessment study.

The projects were primarily focused 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 and 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.

In terms of national projects, the most relevant ones were under the *Geologic, Mining and Metallurgical Investigation* with CODIGEN - a technical institution associated with the Ministry of Energy and Mines, INEMIN, the Ecuadorian Institute of Mining, and with DINAGE National Director of Geology. The main emphasis of these projects was in technical and environmental capacity building.

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

It is important to mention some other national and international initiatives such as the *Eradication of child labour in artisanal mining*, by ILO and USDOL (2002-2004), *Environmental and Health Impacts of Small-scale Gold Mining in Ecuador* (1999-2002)(2003-2005) by IDRC, *Institutions and Organizations in ASM*, IDRC/MPRI (2003), *Non-renewable Natural Resource Study, monitoring and control of Condor mountains* by MacArthur Foundation (2002) as well as two small grants by CASM: *Prevention and control of the contamination in San Gerardo river* (2002) and *Environmental management of the Biron River* (2002).

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

3. Key Issues in the ASGM Mining Framework

In the new Ecuadorian Constitution of 2008, there was a strong mandate to promote economic sectors that generate more employment, add value and substitute the importation of products. The Constitution includes the concept of a grassroots solidarity economy, comprised of micro, small and medium size production units that should be promoted and given priority. Clearly, environmentally and socially responsible small and artisanal miners were important targets for 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.^{xix}

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. Nevertheless this preliminary analysis is based on feedback provided by miners’ organizations and Chamber of Small-scale Mining at a national forum was held in Machala In early 2010. Furthermore, the review of the framework is based on international experience with related issues and approaches.

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

The Mining Law starts with a distinction between artisanal and small-scale mining.

The approach of the Mining Law to small-scale mining is to consider it 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 the 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, creates potentially unhelpful restrictions on that sub-sector.

The Mining Law defines small-scale mining as those operations that have an operating exploitation and/or beneficiation capacity of up to 300 metric tonnes per day. The mining title for this activity is a special small-scale mining concession. Those aspects of the rights and obligations on concessions for small-scale operations that are not specifically regulated under special provisions are governed by the same rules that apply to the concessions of medium and large-scale operations. This principle can pose challenges for the SGM sector where the requirements for medium and large size operations are very complex and costly.

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

Artisanal mining is defined as mining activities carried out by an individual, a family or an association, and which are characterized by the use of tools and simple and portable machines in order to obtain minerals, the sale of which only covers 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 event 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 monthly or annual.

The type of title granted to artisanal mining is a permit with the duration of 10 years that may be renewed for equal periods. The beneficiaries of artisanal permits may only have one permit at a time and for only one determined location.

While 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 or micro to small-scale activities.

B. Type 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 the 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.

It is repeatedly stated that association should be promoted, however it is not clear what the incentive for association actually is, especially in the case of artisanal mining.

The Mining Law maintained the concept of condominium (a single license for multiple adjoining areas) from the previous legal framework. It is not clear if 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 clear restrictions on companies being part of a condominium.

C. Requirements for mining titles attribution

The granting of small-scale mining concessions is made by way of a bidding process. Small-scale miners who apply for concessions of up to 300 mining hectares are excluded from having to enter the bidding process, although they are required to present a petition in order 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 and exclusively be presented by natural persons or corporate entities registered under the small-scale mining system.

The exclusion from bidding for 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 areas. Governments in developing countries have very limited resources to invest in geologic data and do not tend to give priority for identification of areas for small-scale mining.
- The bid system tends to be centralized in the large urban centres far from where SGM operates.
- The level of detail in the proposals tends to be very high (with objective to compare and choose the best project). It will be very difficult to achieve this level of detail in SGM for technical reasons and the cost associated with the process.
- The bidding system can be very demanding for the government because the number of the potential candidates in one bid and the number of bids that the government need to organize to respond to the demand.

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

The granting of concessions for small-scale operations for those not included in the bid system appears to follow the same generic regime as large-scale operations in terms of conditions (for example the duration is 25 years and can be renewed) and administrative requirements. The exception is that small-scale operators do not need to sign a mining contract with the government to perform mining-related activities.

In order 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, volumes and additional information that verifies their classification as an artisanal miner;
- c) Identification of the beneficiation 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 but it will depend how specific the information must be – for example, the information on investment amount or the technical and

environmental details of the beneficiation plant and refinery. For a 'subsistence' sector that only uses hand tools and simple and portable machines it is likely unrealistic to expect the an investment in such detailed plans or processing plants, except if the beneficiation plan refers to the kind of traditional installations use in AGM with some environmental improvements, for example the use of *retortas*.

Both artisanal and small-scale gold mining operations must be registered as such in the appropriate registry. For that registration, the applicants must present a range of information regarding the area, the technology employed and the investment. It 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 and approval of, training programs for small-scale mining can create some obstacles for the legalization process, due to the lack of government capacity to actually 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^{xx}, clearly identified these requirements as a significant obstacle to legalization.

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. To be valid, 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 expressed authorization of the majority of the members.

On the other hand, it appears that the transfer of the rights (total or partial) is not allowed in the case of artisanal mining. This limitation for the artisanal mining operation can constitute a disincentive for any improvement of the activity.

The right and process for a mining title owner to upgrade from artisanal mining permit to small-scale mining concession is not very clear. 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 resides with the government and the procedures are not entirely clear for a title owner to take the initiative to propose the title upgrade.

E. Negotiation and consultation with communities

Procedures and rules concerning social management and community participation regarding ASGM are subject to the generic regime that applies to all mining activities. There is a need to further elaborate on specific procedures and guidelines on consultation that will be relevant for the particularities of the 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 clear need for the controls on child labour, the question of imposing corporate employment models in artisanal and small scale mining 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.

In the case of workers involved in small-scale mining, they must receive 10% of a share of the profits and the remaining 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), with 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 very realistic given limitations on resources, methods of association and accounting realities.

4. Environmental Legal Framework

The Constitution of the Republic of Ecuador establishes several principles from the inalienability of the non-renewable natural resources, to 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. As a direct consequence, the Constitution states 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 for mining environmental protection includes the Environmental Management Law from 2004, which created the environmental system in Ecuador as well as the Mining Law and related General Regulations that dedicates several chapters to environmental provisions for mining projects. The specific regulations for ASM are defined in the Environmental Mining Regulation where there are concrete environmental obligations.^{xxi}

The regulation for ASM defines the following principles and responsibilities of the Ministry of Environment in terms of the creation 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.

The environmental legal framework displays an understanding that regulation must take into account the specific realities of this sector and can be viewed as a model for other countries, although it is only partially regulated and implemented at the present time. As a result it needs further development in order to realize the potential benefits for the sector and its stakeholders.

A. Environmental assessment instruments and Environmental licenses

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

Small-scale mining concession holders must obtain an environmental license for their simultaneous exploitation and exploration operations, beneficiation or processing and commercialization. The environmental license has an annual cost equivalent to two basic unified salaries (~ 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 environmental regulations create the possibility to require joint management plans in the environmental impacts studies but with specific attribution of responsibility. This can allow for cooperation and coordination among adjacent operations, however the relationship between this concept and the mining titles is not very clear. This issue should be clarified to avoid creating confusion around liabilities under a joint management arrangement.

The law is clear in its assignment of joint responsibility related to environment and safety regulations for all those working on a small-scale concession.

B. Pollution control measures

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

i. Legal measures to control the use of mercury

In terms of specific regulatory measures and environmental standards, the act that has the most comprehensive set of standards is the Mining Environmental Regulations. Two principles guide the regulation of mercury:

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

In the generic environmental regulations there are a more comprehensive set of guidelines for use of the mercury in ASGM operations, these include:

- Use of amalgamation cylinders
- Mercury re-activators are used to ensure the recovery of mercury for reuse
- Use of retorts
- Use personal protective equipment to carry out this process
- Mercury must be carefully stored and kept in hermetically sealed containers to prevent leakage
- Direct use of mercury is strictly prohibited in mills, gutters or dredgers.

- Effluents produced in the amalgamation phase must be collected and stored in impermeable reservoirs, which, on the closure of operations, must be rehabilitated in accordance with the provisions of the environmental impact studies.

Ecuador has limited emission standards for mercury contamination. The existing standard is from 1989 and there is a clear need for more current and more comprehensive standards that address not only drinking water, but also air, soils, and other areas of contamination concerns.

The existence of these kinds of guidelines and their future development are critically important to provide producers with more specific information and direction in the handling of mercury.

ii. Cyanide standards and other control measures

As with mercury, Ecuador has limited emission standards for cyanide contamination. The existing standard is from 1989. There is a clear need for more current and more comprehensive standards that address not only drinking water, but also air, soils, and other areas of contamination concerns.

As with mercury there is a need for guidelines to provide producers with more specific information and direction in the handling of cyanide. The risks associated with cyanide management were recognized by large companies and resulted in a voluntary Cyanide Code, developed with UNEP and ICME, which was designed for large-scale operations.^{xvii} A parallel set of guidelines, relevant to small-scale operations is needed and consideration should be given to making these guidelines part of the regulatory requirements in order to protect operators, communities and the environment.

iii. Explosives

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

iv. Closure of mining operations

Mining closure and rehabilitation is an obligation for all mining concession holders. These requirements are relatively new for the ASGM sector, but are increasingly be recognized as a part of responsible practices in order to prevent future contaminated sites through proper planning. They are required to present an environmental management plan for rehabilitation and closure for the operations that were partially or totally abandoned^{xviii} after the exploitation, beneficiation and smelting or refining activities.

In the case of artisanal and small scale mining there appears to be an obligation for rehabilitation and closure. The main problem is that for the artisanal miners the obligation of rehabilitation and closure is not clear from the beginning of the operation because it is based on a post-closure assessment. It appears that there is no requirement or guidance for any prevention tools, for example a simplified plan of rehabilitation and guidelines with simple techniques that can 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 that deal with projects of rehabilitation and recovery can be 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 by international or national institutions provide it. 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 these requirements are all important they would likely be more efficiently managed through a more consolidated and integrated environment license that would be easier to administer for the government and the miners alike.

i. Authorization of mineral beneficiation 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 tonnes per day.

Individuals or companies, even if they are concessionaires must apply for authorization to install and operate these with the respective environmental license. The administrative

requirements to obtain this environmental license, which are not yet detailed in regulations, will be important in measuring its success.

ii. Water authorization and treatment

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

iii. Health and Safety

The environmental regulation defines a generic 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 in terms of Occupational Health and Safety Regulations and related plans for artisanal and small-scale mining will be very important in terms of its implementation and effectiveness. This is an area where there is a critical need for guidelines and safety regulations specific to the realities of ASM, and where relatively simple initiatives can have a significant impact on the objective of improving worker health and safety.

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

A. Lessons learned from experience

Conflicts between artisanal and small-scale mining and medium and large-scale mining are rooted in the 1980's when there was a government policy to promote medium and large-scale mining but ignored the small-scale mining sector despite their significant presence in the economy. These conflicts were partially resolved in the 1990's by the measure to legalize all ASGM operations.

Nevertheless, new conflicts emerged during the 1990's. The fact that they did not have specific procedures to manage the emerging market for the transfer of mining rights and to guide the negotiations between small mining to large companies was a key problem that allowed conflicts to develop. The lessons that can be taken from the positive cases^{xxiv} and negative cases^{xxv} show that the success (or lack thereof) was largely based on the will of the company to negotiate with ASGM as well as the negotiation experience of the ASGM actors. Of course these factors are always important but the fact that they 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 what have traditionally been artisanal and small-scale mining areas. The potential for anticipating and avoiding many of the conflicts is there with the existing legal framework, but will be dependent on the capacity and the commitment of the government to implement the programs and enforce the standards in a balanced manner. Furthermore, it will be important to further elaborate (from the small scale miners' perspective) guidelines for small and large-scale operation cooperation and interaction such as those developed by the International Council of Mining and Metals.

B. 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 has dispositions to regulate simultaneous mining activities in a concession, but only with authorization of the concession holder and under the umbrella of an operation contract.

The operation contract must follow the instruction from the Mining Ministry and these contracts must be signed as a public document and registered in the Mining Register. 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 objectives 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 operation contract. If these kinds of tools are not available 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 in other types of partnerships such as consortiums or joint ventures, for example. This is also related to an important point regarding the promotion of partnerships between small-scale mining concession holders and artisanal miners permit holder, which was analysed in section 3.B.

6. Key Institutional Elements and Lessons Learned

A. State function in the formalization

- i. Ministries of Mining and Environment or corresponding executive government institutions*

Institution	Responsibilities
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Constitutional Mandate	<ul style="list-style-type: none"> Promote the development of small-scale and artisanal mining, and to 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 ASM 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 ASM
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 ASM sector, adopting clearly defined processes and procedures for application. No special department to deal with ASM 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 Geological, Mining and Metallurgical area. 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 ASM 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.

It is clear that the government is committed to address the different dimensions of ASGM but it is also very clear that 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 to create better institutional conditions such as dedicated departments or directorates to deal with ASM, 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 with ASGM.

ii. Distribution of responsibilities at the Provincial and Municipal levels

In the new Ecuadorian Constitution decentralization is defined as a principle but the Constitution attributes very clear exclusive national responsibilities for the management of the mining sector. The Constitution defines that the central administration has the exclusive responsibility for mineral resources as well as natural resources including biodiversity, forests and water resources. The Mining Law and General Regulation reinforce central responsibility through the management of mining titles and environmental licenses. 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 distribution of these government resources, which can have a very interesting effect on the building of infrastructure and associated capacities at the municipal and local levels.

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.

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

B. The role and of miners' organizations in the formalization process

At the present moment, in terms of the miners' interests advocacy groups, the main organization 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 y Zamora areas. 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 1990's and around the same time other organizations were formed to defend the interest of the mine workers, including as FERPEMA - The National Federation of the Austro and Regional Federation of Miners of Ecuador and later (1996) FENAMINE- National Federation of Miners of Ecuador.^{xxvii}

Ecuador has an interesting history in terms of the role of regional and national cooperative federations in the 1980's that defended the interests of ASGM and culminated with the promulgation of the legal dispositions that, in the early 1990's, allowed the legalization of ASGM operations that had been previously illegal.

Nevertheless 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 and provides the chance to generate more democratic structures (avoiding informal monopolies and exploitation of workers) including for the miners at the bottom of the organizational pyramid.

C. Roles and major initiatives of academic, research and technology centres in the formalization

In the 1990's, there were a number of ASGM initiatives mentioned in section 2.B that focused on mercury and cyanide processing and related technical assistance towards minimization of the environmental impacts and workers, which were supported by international cooperation with the important involvement of national and regional universities and 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 curricular courses in the universities or research centres. An additional limitation was that the capacity building occurred in some areas such as environmental and mining engineering but less in law or economy, administration or business schools.

The new legal framework addresses the important role of universities, polytechnic schools, research centres and institutes in the capacity building and assistance to ASM which can range from the development of new technical and environmental tools to all kind of innovations with the aim to improve 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 governmental 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.

7. Economic Instruments in the Formalization of the ASM Sector

Although it is yet to be executed the new legal framework encourages the importance of economic incentives as a tool to improve practices. The regime^{xxviii} 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 generate a motivation to comply with the rule of 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), the costs can reduce the efficacy and defeat the purpose of the incentive.

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

i. Fiscal regimes, royalties and fees

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

The regulation is clear that for small-scale mining, for profits the percentage is 5% for the state, as opposed to 12% for LSM (for more information, see section 3.F). 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, but until regulations are promulgated, it is not clear if ASGM must pay income, windfall or value-added taxes or if they are also exempt from these taxes.

In addition, holders of small-mining concessions rights must pay 3% of royalties based on the 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 subject to the payment of royalties.

With respect to the mining concession application fee, small-scale mining concessions pay a one-off fee equivalent to two minimum salaries (US \$528)^{xxix}.

Small-scale mining operations pay an annual conservation patent the equivalent of \$2 - \$10 US 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 patent.

It is difficult to evaluate the total amount of taxes for artisanal and small-scale mining because of the lack of clarity of some of the tax policy on some 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.^{xxx}

ii. 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 license 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 license.

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.

The following are considered to be illegal trade in mineral substances:

- a. Mining concession holders who trade domestically or export metallic minerals originating from other concessions, without the trade license;
- b. Mining producers who 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 operation (who are often paid in gold) it may be a problem, in particular if they need to obtain license 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 licenses.

B. The role of credit mechanisms

ASGM in Ecuador has been considered a high-risk sector without clear legal rights and a lack of transparency in the commercialization of the gold. This situation may have contributed to the lack of formal credit initiatives to help to finance ASGM activities. The lack of information on mineral reserves or accounting data, 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 problems with this informal type of support is that they mean the financial capacity to improve the ASGM operations is either very slow and/or that problems of unregulated credit schemes that can lead to abuses and exploitation, centralization of power in small group of people, money laundering from illegal activities and the encouragement of 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, the area can be up to 5000 mining hectares, can be transferred and where associations are promoted. These basic conditions (regardless of data on the mineral potential of the area) can provide market value to SGM operations and the related conditions 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 finance support through a development bank to promote small credit initiatives to improve the operations.

Artisanal gold mining deserves greater attention from credit initiatives from the government because they are at the bottom of the ASGM pyramid and are is the sub-sector that most need and are most unlikely to have private credit initiatives.

C. The 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 the 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, since the 1990's the country has been building the ASGM sector 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 the ethical initiatives

very often promote capacity building to achieve the standards in the operations that will be certified.

Furthermore the present government has a mandate to promote ASGM and 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 gold ethical gold market initiatives.

In 2004, Ecuador was chosen by the Alliance for Responsible Mining (ARM) 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. The Bella Rica Cooperative is based in the canton of Ponce Enriquez, province of Azuay, southern Ecuador. COMIMACH processes an average of 300 metric tons monthly, producing approximately 896g for the cooperative monthly. The Bella Rica Cooperative includes a mine and a processing plant, which also offers processing services to third parties.

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 clear procedures for solid waste and effluents, using bioremediation to treat cyanidation tailings which are safely stored and detoxified in an impermeable impoundment;
- organising the whole mine and processing plant; and
- formalising all commercial operations and all migrant temporary workers.^{xxxi}

The Fairtrade and Fairmined certification process started in the end of 2010 and the cooperative is still in the process of achieving its certification. ARM has been working with a total of 9 pilots distributed across Latin America since 2004 with objective to prepare them for certification.

To obtain the certification and use the certification 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:

- where the legal framework allows for the formal legal recognition of the operation;

- when the royalties are set at an appropriate level (when 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 level that is competitive to export.

8. 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 was the fact that Ecuador never had a significant medium and large-scale mining sector. The absence of these influences allowed the space for ASGM to get the necessary internal support to be considered an important economic activity in its own right. It allowed space for the sector to grow even during the periods when the regulations were not very favourable to ASGM legalization.

Although these 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. They were able, through various organizations, to defend the interests of the sector to the point where there is now a substantial national small-scale mining economy where 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 in 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 consider further analysing and discussing the following points:

- Having at least two or three categories of mining titles for each sub-sector to help deal with the diversity of organization, financing and technical knowledge across the sector;
- It is important that the administrative and operational requirements to obtain the mining titles are appropriate to the capacity of mining operation to accomplish them. Consider reviewing existing requirements;
- 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 ASGM sector to ensure its relevance to the particular labour models;
- Developing guidelines for the consultation process related to ASGM;
- Reviewing and clarifying approaches to profit-sharing.

C. Environmental Licenses

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 as well as contaminated mining waste. No less important are the challenges in social issues, especially related with health, security and economic stability. In terms of environmental licenses, 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:

- Prepare guidelines about mine closure for both sub-sectors;
- Develop specific legal guidelines for the use of cyanide similar to those for mercury;
- Develop guidelines for occupational health and safety regulations;

- Create economic incentives and technical support to promote the rehabilitation of old contaminated mining sites;

D. Relationships between Large and Small-scale Mining

In terms of the relationship between large-scale mining operations and ASGM the framework is designed to promote the formal recognition and cooperation amongst mining titleholders. The legal framework creates incentives that promote the 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 venture and consortium;
- Generate guidelines and contract models for the potential partnerships, including clarifying the rights and obligations related with ASGM activities in the partnership;

E. Government and Institutional Structure

The present legal framework defines responsibilities of the government in the management of mining and environmental licenses for ASGM operations. The fact that the actual framework is very 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 of 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 incentives 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 development of an approach to addressing smuggling, including inter-regional actions regarding harmonization of royalties and export taxation.

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10. Endnotes

ⁱ The area of the Zaruma-Portovelo gold mining has been worked since at least the Incan period, and is estimated to have produced 141.75 tonnes of gold during the past one hundred years. Geopulse Exploration inc. <http://www.geopulseinc.com/ecuadorhistory.php>

ⁱⁱ Sandoval, Fabián, *Small-Scale Mining In Ecuador. Environment And Society Foundation*. MMSD, IIED, October 2001 No. 75

ⁱⁱⁱ Sandoval, Fabián, op cit.

^{iv} For more information see <http://goldinvestingnews.com/8324/gold-mining-in-ecuador.html>

^v Centro de Investigación y Planificación del Medio Ambiente, CIPMA y Centro Internacional de Investigaciones para el Desarrollo, IDRC Iniciativa de Investigación sobre Políticas Mineras, IIPM, *MINERÍA, MINERALES Y DESARROLLO SUSTENTABLE EN AMÉRICA DEL SUR*. Equipo MMSD América del Sur. IIED, WBCSD 2002

^{vi} For more information see <http://goldinvestingnews.com/8324/gold-mining-in-ecuador.html>

^{vii} Tibbett; Steve. Recasting the Debate on the Economic and Development Benefits of Small Scale and Artisanal Gold Mining. December 2009. http://www.fairjewelry.org/pdfs/Goldenoppfinal_lowres.pdf
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^{viii} Recently the Ministry of Non Renewable Resources finished the Artisanal Census that provided 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

^{ix} Sandoval, Fabián, op cit.

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

^{xi} Sandoval, Fabián, op cit.

^{xii} Lacerda, Luiz Drude de, *Updating global Hg emissions from small-scale gold mining and assessing its environmental impacts*, Environmental Geology, 2003

^{xiii} The article *Small-scale Gold Mining in the Puyango River Basin, Southern Ecuador: A Study of Environmental Impacts and Human Exposures* by Oscar Betancourt, Alberto Narva´ez, and Marc Roulet, 2005, 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. On the other hand the levels of lead in the target population were very high and there is a suspicion that this lead may come from other sources including the use of lead in pottery.

^{xiv} 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; International Journal of Occupational and Environmental Health: Official Journal of the International Comm (TRUNCATED)*, 12(3), 209-214.

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^{xv} Velasquez, Patricio C, Technical report. United Nations Industrial Development Organization, Vienna May 2007 (online report)

^{xvi} 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.

^{xvii} (1993-2000 – a two phase project) with the Swiss Technical Cooperation COTESU, along with the State Secretary of the Environment in the Ministry of Energy and Mines and Ecuadorian NGO, Fundacion CENDA

^{xviii} (1995 to 2002) with the World Bank, British DFID, and Swedish International Development Agency (SIDA) along with Ecuadorian Ministry of Energy and Mines.

^{xix} Tobar & Bustamante. COMPILATION OF ECUADORIAN MINING LAWS (English and Spanish versions)

^{xx} 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

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^{xxi} Tobar & Bustamante. Op.cit

^{xxii} see <http://www.cyanidecode.org/>

^{xxiii} 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, the term; and, c) When it is not possible to determine their ownership.

^{xxiv} ODIN and Miners from San Gerardo and Pinglio (1994), IAMGOLD and miners from Zaruma-Portovelo (2000) and PROMINEC and Miners from Ponce

^{xxv} MINPALCA and Miners from Ponce Enriquez and Gabi (1997) and *GRIVIP ANDOS and Nambija Miners (2000)*

^{xxvi} Experiencias De Gestión Ambiental Local Para La Conservación De La Cordillera Del Cóndor, En Los Andes Tropicales Del Sur Del Ecuador. Taller sobre “descentralización de la gestión ambiental en proyectos apoyados por Fundación MacArthur en América Latina y el Caribe”, Bariloche, octubre de 2007.

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Sandoval, Fabián, op cit.

^{xxviii} Tobar & Bustamante. Op.cit

^{xxix} The minimum salary changes regularly

^{xxx} Memoria Del Foro: Las Políticas Públicas Para La Minería Artesanal Y A Pequeña Escala Responsable. Cámara de Comercio de Machala, 26 de marzo de 2010. Op cit

^{xxxi} In website of ARM is possible to find this information and more about this cooperative.

www.reponsiblemining.org