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MONOGRAPH

"Social and economic impact of the developing mining industry in Ecuador"

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Summary

The aim of this paper is to inform people of the importance of the mining industry as one of the pillars of the economic and infrastructural development of the country, since many the country's rich mineral reserves are essential in the production of industrial materials. It also describes how the mining industry works and what it consists of, also analyzing the contribution of the mining industry towards society. It also aims to explain how the industry has changed throughout the years despite ever-present issues.

The reader will also be informed of the continued disinterest form the government when it comes to providing guarantees to foreign companies and their capital, the various laws and regulations that aim to protect the industry and the environment, and of all the biggest projects currently developing on Ecuadorian territory. This paper will also explain how a mining project can have a deep effect on the surrounding population, socially and likewise economically.

It also explains the legal responsibilities of both private companies and the state (and its various strategies of social inclusion). A short explanation of the mining materials found in each mining projects is also included. The paper also includes a conclusion that encapsulates the most important information already detailed.

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Introduction

The aim of the following monographic paper is to conduct a thorough analysis and study of the economic and social impact of the developing mining industry in Ecuador, at the same time describing the biggest ongoing a future projects taking place within ecuadorian borders to analyze how these ventures impact the surrounding land not only environmentally speaking, but also socially and economically (surrounding populations). We're talking about an activity that has been conducted since pre-columbian times and is still essential in the development of many societies and world's wealth in general.

Mining has been discussed nonstop in academia for centuries, with various authors and students writing thesis and papers studying the topic, like SME, authors of Society for mining, metallurgy and exploration. Another example is the thesis by García Vela and Villega Fajardo, Mining Projects in Ecuador. The first references to mining and its methods were found in ancient greece and rome, where they discussed the extraction and refining methods of gold, silver, mercury and copper.

The paper will consist of three chapters: chapter one will discuss mining as a human activity and the developing of the industry in Ecuador. Chapter two analyzes the economic impact of the mining industry and explains tributary laws and obligations regarding mining, as

well as other rights and laws. Chapter three measures the social impact of the various mining projects throughout the country, positive and negative.

It goes without saying that there are many projects in course and many that will start in the future. They're all big scale projects and are called that due to the large quantities of materials they aim to extract.

CHAPTER I

The mining industry

1. Mining as a human activity

The act of processing and extracting minerals and other materials has been a key aspect in the development of humanity as a whole. This industry has shaped the path of humanity and will continue to do so in the future since the vast majority of materials we use in most industries are fruits of mining. Extracting, smelting and refining of metals are all techniques that date back to before the bronze age. In fact, the first references in writing about mining were found in Ancient Greece and Rome, in which they discussed the extraction of gold, silver, mercury, and copper, even going as far as to mention the mines of Huelva, Spain, which are currently exploited by Australian company Rio Tinto. (Society for Mining, Metallurgy, and Exploration, Inc., 2011)

Throughout history, we find great civilizations that made mining the pillar of their economies, way of living and development. One such instance was the gold rush, a period of time in the 19th century in the US (mostly in California) which helped develop and create the strong infrastructure (Society for Mining, Metallurgy, and Exploration, Inc., 2011). Another case is that of the African continent (especially the south and west) where the mining industry

is a vital component of the economy. South Africa is even recognized as the pioneer country in the resolution of complications found in deep mining.

Latin America has long been considered to be trailing behind the rest of the world when it comes technological advances in mining techniques. However, the riches found in its soil have contributed immensely to the wealth of the world. The gold and silver of the Inca empire built the Spanish empire, for example. The Morro Velho gold mines in Brazil and the copper and silver mines in Cerro de pasca, perú have been continuous sources of precious materials for centuries. There's also the case of Argentina, a country that was considered the third richest country in the world after WWI, mainly due to its silver mining industry.

The romantic perception of the mining industry used to describe the craft as an honorable enterprise, one which benefited distant or disconnected sections of mankind and brought them development, prosperity and order. Nowadays, that image is long gone. The industry's image has suffered irreparable damage due to centuries of basically destroying everything in its path (not to mention the gross human rights violations that the industry indulged in for centuries). Irresponsible mining has no regard for anything, be it the environment, society or governmental regulations. However, there are companies out there that are preoccupied with these aspects of the trade, doing their best to comply with regulations and respect the environment as well as their workers.

Even though most of the mining industry agrees that responsible mining, one which is conducted in harmony with the environment, is possible, the true challenge faced by the industry is "To convince the social structure, government agencies, and non-governmental organizations that mining can (and will) be done in a safe and environmentally compatible manner" (Society for Mining, Metallurgy, and Exploration, Inc., 2011)

1.1 The mining industry in Ecuador

In pre-Columbian times, various indigenous communities were already making tools, utensils, and adornments with gold, silver, and copper, which were usually obtained in alluvial deposits located in rivers and ravines.

According to archaeological studies conducted in the 15th century, the newly arrived Incas were surprised at the sheer amount of gold found in the now Ecuadorian territory and by the local's use of other metals, mainly the cañaris (Rosero, 1986). With the arrival of the Incas, the cañaris were forced to migrate east, settling close to the cuyes and Cochabamba rivers, where they continued to exploit the alluvial sources of gold.

Other cultures in the coast were also showing signs of advancing the use of metals in their everyday lives: the La Tolita, Jambelí, Guangala and Jama Coaque cultures benefited greatly from the cultural and commercial exchange with each other and with the Incas. It also

helped that the coastal cultures exchanged salt with the Incas (a material they deeply appreciated) and so mining techniques spread throughout Ecuadorian territory (Gordillo, 2014).

With the arrival of the Spanish came the surge of mining practices, with a primary focus on gold and silver reserves. Spanish colonizers settled their homes and communities around the exploitation sites, with the aim of having complete control of the production of the mines. The cañaris were forced to show the colonizers the locations of their prized alluvial gold reserves, allowing the Spanish to assume control of the primary deposits of gold from these rivers.

The first deposit found was the famously named Vizcaya vein (located in Zaruma), which was taken over by Alonso de Mercadillo, who founded a mining settlement close to the deposit. From this point on, Spanish settlers would start extensive mining projects in Chitazón (Carchi), Valle del Malal and Santa Bárbara (Azuay), Porto Velo (El Oro province), Nambija (Zamora), Valla Valladolid, Loyola and Logroño (Morona Santiago). They also began using rivers in Esmeraldas to wash platinum and gold ore (Gordillo, 2014).

The mines in Nambija were exploited for resources by the Spanish for 30 years, right until the indigenous uprising, an event that resulted in the downfall of the mine and its operations, which led to the founding of two cities that would serve as hubs of sorts for

mining operations, Cuenca and Valladolid. Cuenca went on to be a pillar for the mining industry.

The first mining boom came around the half of the 16th century, when the Spanish began reaping the benefits of the infamous mitas, a system in which all adult males of the indigenous population were obligated to work at the mines, a job for which they got a minuscule salary and food rations from the owners of the mines. This system was masterminded by Viceroy Toledo, who basically took a working system created by the Incas and used it to benefit the Spanish crown with (practically) free labor, eg slavery.

In 1886 (Ecuador was already a republic by then) the South American Development Company (SADCO) was created with American capital. The company's mining efforts led to the discoveries of various sites in Viscaya, Sexno, Portobelo, El Tablón, and El Doblado. The SADCO contributed studies, technological breakthroughs, and techniques, while also serving as a school for aspiring Ecuadorian miners until the cease of its functions in 1950. In 1952, mining operations were left in charge of the Associated Industrial Mining Company, which was formed by ex-SADCO members.

However, in 1978, the company declared bankruptcy due to low income and rising expenses. The various economic issues of national mining companies led to the rediscovery of sites like nambija and Ponce Enríquez, Cerro Pelado, etc. This paved the way for the

contemporary of mining in the country. This apparent rediscovery of Nambija led to a rise in both legal and illegal mining operations in the country. Illegal miners often used sloppy methods, and constructed mines and caverns without first conducting safety studies. This led to the accident of Nambija, when the mines collapsed due to instability, resulting in 250 to 300 miners buried under the dirt. Despite all this, Nambija has still considered an important exploitation site due to its great deposits of gold.

1.1.1 Development of the mining industry in Ecuador.

Mining projects in Ecuador have historically shown to be behind in terms of the latest technologies and techniques, which means not all corporations who took an interest in the mining industry did so properly (Gordillo, 2014).

When it comes to South America, Ecuador stands out as the only country that hasn't exploited its vast resources on a big scale. On the other hand, countries like Chile, Perú, and Bolivia have well-established mining industries, being the prime exporters of metallic materials, while Argentina and Colombia are great examples of robust mining industries as well.

The answer as to why Ecuador is such an underachiever when it comes to this particular industry is simple: it's difficult to develop and maintain mineral deposit, and also

the lack of access to the latest technology and techniques. Another impediment is the coordinated effort by environmental activists and non-governmental agencies to stop new mining projects that they deem would deeply affect the environment or the communities surrounding these projects. These efforts disrupt the management of the mining industry in the country and halt its progress. As a result of all these factors, only small, local mining projects exist within the country (metallic and non-metallic minerals, construction materials, etc). However, many studies have actually been conducted to contemplate the possibility of big scale projects, but these would require important foreign investments that the country simply doesn't possess.

Within the vast variety and array of products and materials that mining projects extract from the earth, perhaps the one that has the most influence on the country's economy is the extraction of non-metallic resources. These resources are essential because they provide essential working materials for construction work. Refined materials such as cement and clay are also pillars of the ceramic industry. As for metallic minerals, the situation isn't quite clear. However, there has been a better management of resources thanks to the reorganization of the mining industry, but reports from past years don't show a clear view of the practice, as most mining in Ecuador is done informally. Despite this, it's projected that the production of each of the metallic minerals available in the country's soil will grow 15% annually.

1.1.1.1 Most important mining projects in development.

Thanks to governmental efforts during the last few years, 5 big scales, emblematic mining projects will become a reality thanks to foreign investments. These projects won't only reactivate the mining industry, giving it the importance it deserves, but it will be of great relief to the country's constrained economy. They will generate a considerable number of jobs directly and indirectly related to the projects. Also, it's expected that these projects will have a tremendously positive impact on the country's GDP. These projects are the following: Fruta del Norte (Zamora, Mirador Zamora), Río Blanco (Azuay), Panantza (Morona Santiago) and Loma Larga (Azuay).

1.1.1.1 Fruta del norte.

This project started in the beginning of 2017 and is being developed in the Yantzaza canton, in the Zamora Chinchipe province. The companies in charge of this project are canadian company Lundin Gold and its ecuadorian branch Aurelian Gold S.A.

The aim of this project is to exploit gold and silver reserves, investing an estimated 960 million dollars. The gold reserve contains 4.82 million ounces of gold, and the silver one contains 6.34 million ounces. The project is currently in its implementation phase, with

production estimated to begin in the first trimester of 2020. Its expected that mining activities will continue for at least 13 years, and its classified as big scale mining.

1.1.1.1 Mirador.

This project began towards the end of 2015 and its taking place in Tundayme, located in El Pangui canton, Zamora Chinchipe province. The company developing the project is Ecuacorriente SA, which is a branch of the chinese CRCC-Tongguan consorcium. The aim of this project is to exploit copper reserves for the most part, but also silver and gold, with an investment of 244 million dollars.

The mineral reserves this project wants to exploit are the following: 2.69 tons of copper, 26.08 million ounces of silver and 3.2 million ounces of gold. It's currently in the exploitation phase. This project represents a milestone in the ecuadorian mining industry, since its the first big scale mining project already being operational.

The mining technique being used is open pit mining, and its expected to last 27 years.

1.1.1.1 Rio Blanco.

This project began in 2015 and its taking place in Molleturo and Chaucha, located in the Cuenca canton, Azuay province. The company in charge of this project is Junefield Resources Ecuador SA, which was founded by chinese investment firm Junefield Group SA. They aim to

exploit gold and silver reserves. Broken down, the reserves contain the following: 4.3 million ounces of silver and 0.6 million ounces of gold. An 88.8 million dollars investment will fuel the project.

The production stage of this project began in the second semester of 2017, and its catalogued as medium scale mining. The mining technique deployed is subterranean mining, and the project will last for 11 years.

1.1.1.1 San Carlos-Panantza.

This project began in 2015 in the Santiago de Panantza and San Juan Bosque cantons, located in the Morona Santiago province.

Explorcobre SA, a chinese firm, are the ones in charge of the project, which aims to exploit mainly copper and gold, shelling out an investment of 3 thousand million dollars, and its currently in the advanced exploration stage.

The reserves contain the following: 9.2 million pounds of copper, 28 thousand ounces of silver and 1700 ounces of gold. It falls under the small scale mining category, and will use open mining techniques. It's expected to last 25 years until completion.

1.1.1.1 Loma Larga.

This project began in 2013, and its located in the Portete canton, in the Azuay province.

INV Metals SA, a canadian company, are in charge of the development of this project, which seeks to exploit mostly gold and copper. The site has 1.135 million ounces of gold, 5.68 million ounces of silver and 21 million tons of copper. The company is looking at an investment of about 244 million dollars.

The project is currently in the advanced exploration phase and its catalogued as middle scale mining. It's expected to last 27 years, using subterranean mining techniques.

Chapter II

Economic impact of the mining industry in Ecuador

2. Ecuadorian mining legislation and tributary regime

The mining law oversees the regulation of any intervention or interaction between the government and mining companies, foreign or national. This law also serves the purpose of controlling and managing the mining industry, but above all, it's there to actively prevent any sort of damage that the very nature of these activities implies. The government has the power to grant access to the companies that can prove they have the means to to exploit and commercialize the minerals they seek to extract, doing so in a responsible manner that is fair to those involved.

Regarding the hierarchy of institutions that control the mining industry in Ecuador, the first and main instrument is the constitution. Then come mining laws, then general and specific rulings, and lastly, resolutions, statutes and rules.

All of these organisms help control the industry as well as develop it, with a special focus on eradicating illegal mining practices and generating favourable conditions to attract foreign investments, paving the way to a sustainable and responsible mining industry within the country.

Within the ecuadorian constitution, mining activities are protected under article number 408, which states:

"Nonrenewable natural resources and, in general, products coming from the ground, mineral and petroleum deposits, substances whose nature is different from that of the soil, including those that are located in areas covered by territorial sea waters and maritime zones, as well as biodiversity and its genetic assets and the radio spectrum, are the unalienable property of the State, immune from seizure and not subject to a statute of limitations. These assets can only be produced in strict compliance with the environmental principles set forth in the Constitution" (La constitucion del Ecuador , 2008).

"The State shall participate in profits earned from the tapping of these resources, in an amount that is no less than the profits earned by the company producing them" (La constitucion del Ecuador , 2008).

The State shall guarantee that the mechanisms for producing, consuming and using natural resources and energy conserve and restore the cycles of nature and make it possible to have living conditions marked by dignity.

Within the institutional structure that controls the mining industry we have the sectional ministry, and the control and regulation of mining activities agency (ARCOM in spanish), the national institute of geological, mining and metallurgical investigation, the national mining company (ENAM in spanish) and the municipalities.

In regards to the tributary matters, according to the rules to be applied, the executive order 374 establishes that mining companies are obligated to pay royalties, mining conservation patents and labour utilities according to tributary law.

The Internal Revenue Service (SRI in spanish) is responsible for collecting the fiscal obligations of the mining industry, according to the tributary code and the mining law.

2.1 Conservation patents.

Conservation patents are an obligatory fee to be paid by the company responsible for a concessions periodically in order to keep their rights over the concessions.

They're paid the march of every year. The fee varies depending on the level of completion and what phase the project is in. Projects in the initial exploration phase are to pay 2.5% of the minimum wage per hectare. Projects in the advanced exploration phase are to pay 5% of the minimum wage per hectare and those in the final phase of exploitation are required to pay 10% of the minimum wage per hectare.

2.2 Mining royalties.

Mining royalties are monetary compensations which (obligated by law) are to be paid by the holders of every mining concession as a way to compensate the state for exploiting its resources. The state shall participate in the benefits of the exploited resources in a sum not lesser than the holder.

This sum is paid in accordance to the percentage of sales of the acquired minerals, and is collected semiannually, in the months of march and september of every year.

2.3 Utilities.

According to the labor code, the employer or company has the obligation to distribute 15% of its net utilities to its workers, which is to be distributed in the following way: small mining operations pay 5% to the state and 10% to its workers. Medium

mining operations pay 10% to the state and 5% to the state, while big scale mining operations pay 12% to the state and 3% to the workers.

2.4 Economic impact of the developing mining industry in Ecuador

The ecuadorian mining industry is currently on the rise due to the various projects being planned or carried out, all being international, big scale projects with a lot of resources estimated to be exploited. Undoubtedly, the completion of these projects will help the economic situation in the country, raising the GDP.

On a world scale, the mining industry has enjoyed a favourable period lately. The cyclic behaviour of the prices of the most important minerals (gold, silver and copper) reached its peak around 2008. From this point on prices have steadily dropped due to low demand on a global level. However, demand is expected to rise in 2016, particularly in asian markets.

Previously, the Ministry of Non-Renewable Natural Resources had the responsibility to manage two strategic sectors for the development of the country: the oil and mining industries. Due to the importance of the oil industry to the country's economy, the mining industry was usually overlooked, its potential left untapped for

decades. With the objective of exploiting the country's resources in a legal and safe way, as well as attract foreign investment, a new institution was created.

As stated before, big scale mining projects have big mineral reserves at their disposal. The main metals found in these reserves are Copper, Silver and Gold, which will bring economic growth and prosperity due to all the royalties and patents due to be charged by the government and most importantly the jobs and opportunities created in the area.

According to data provided by ARCON (regulation and mining control agency) the mining industry has had a positive impact of about 1.30% of the country's GDP during the last ten years.

Approximately 4500 million dollars are expected to be invested in the mining industry, which will generate an important source of income for the state in the form of taxes.In the Mirador project only, the government expects to rake in 5000 million dollars in the next 25 years.

There's also all the benefits to the ecuadorian workforce gaining jobs, as, due to mining laws, all companies are required to use exclusively ecuadorian workers. Then there's secondary projects to help the mining ones, such as the Santa Cruz hydroelectric project, it's aim being

providing the Mirador project with electric energy and will be given to the state at the end of the project. The Puerto Cobre project in Puerto Bolívar also stands out, as it will be the main exit of copper.

For the Fruta del Norte project, benefits from taxes count the 13 years of the project which will be 934 million dollars. It will also employ 2040 people (1300 direct employees, 260 contractors and 800 other positions throughout the duration of the project). Local and regional infrastructure will see benefits as well.

The Loma Larga project will go on for 12 years and leave the state around 380 million dollars in tax benefits. It will also benefit 500 direct job positions and improve regional infrastructure, all this while also investing in community programs.

It's estimated that these projects will mark an increase in GDP from 1.3% to 4% in the next 8 years.

Chapter III

Social impact of the mining industry in Ecuador

3. Government policies regarding social inclusion

According to chapter 3, article 87 of mining law --right to participation and consultation-- ''the state is responsible of carrying out processes of participation and social consultation through the respective public institutions that the constitution dictates. Said task is not to be delegated to any private institution'' (Ley minera, 2009).

This means that the state is legally obligated to inform the communities affected by these mining projects of just how they will be affected and exactly where these projects will take place. They're also obligated to ask the communities if they agree to mining projects taking place in their vicinities. Also, "all mining companies are required to respect and cooperate should any person request access to the information regarding the company's handling of environmental processes and regulations" (Ley minera, 2009).

These measures are put in place to protect communities from possible abusive practices from mining companies, sometimes resulting in the state withdrawing mining licenses from the company. One such case happened in the Río Blanco project. The rural communities of

Molleturo and Chaucha took the contractors to court due to legal violations (the licensed company, eurogold mining, violated the right of previous consultation). The judge favoured the communities and subsequently all mining activities and exploitation were suspended.

One of the biggest benefits that sways these communities to accept mining projects in their vicinities is that 60% of royalties are invested in important projects for the community, promoting steady, sustainable social progress through the action of local municipalities. When seen fit, 50% of the money is distributed to indigenous chapters and communities.

Conclusions

At the end of this monographic work it is concluded that:

- Mining practices have been essential in the development of humanity for millennia. Many modern-day countries in Latin America are rich thanks to it. May of these countries owe their mining practices to their native people, because they spread the trade originally.
- Ecuador has a big problem when it comes to developing its mining industry due to a lack of access to the latest technology, the difficulty of extracting minerals and due to a general lack of interest in exploiting its many reserves of minerals.
- Thanks to foreign investment, five big projects are currently in varying stages of completion in the country. These are big scale projects that will help the country's GBP and economy immensely. They also help by putting the mining industry back on the map. Many jobs and opportunities will also be created, as all these foreign companies are legally obligated to employ Ecuadorian workers.
- Once projects start, the state has no power of intervention in their development, but it does have the power to create a very competitive environment when it comes to who gets exploit these territories and has the upper hand when negotiating with companies. Once they pick a company, the state has the obligation to inform any potentially affected communities of their choice and to get explicit approval from the community before proceeding with these projects. Mining laws bind both the state and private companies to

follow these guidelines and be held accountable for any environmental damage caused to Ecuadorian territory.

Recommendations

At the end of this work is recommended that:

- The government take a bigger interest in the industry for it to grow more, associating itself with foreign mining industries in order to keep up with technological advances and techniques.
- People learn more about mining practices and how it has helped develop build empires and societies, and how it has become what it is today and just how it works.
- Authorities get a tighter grip on illegal mining practices, as these enterprises do more harm than good to surrounding communities and practice poor safety measures, putting their workers at great risk.
- That mining companies keep showing that mining is an activity that can respect environmental guidelines and regulations, leaving no mark on the environment or the communities surrounding these big scale projects.
- The mining industry in Ecuador develop more in the technical sense, meaning that many companies don't have the resources, technology or techniques necessary to carry out such an important and dangerous (to the environment and themselves) activity.

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