The Global Observatory of Transnational Criminal Networks

Introduction to trafficking of Gold and Coltan in Colombia

No. 1

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Disclaimer

The facts and the analysis presented herein are sustained in documents and interviews exposed in mass media and judicial records related to the criminal networks analyzed. No primary information uncovering facts has been gathered, which means that only secondary sources were consulted, from legal to media documents. In the case of the names mentioned, quoted or referenced on indictments —with the exception of those specifically mentioned, quoted or referenced in the text as definitively condemned-, the presumption of innocence, in observance of individual rights is always preserved.

The judicial truth is the jurisdiction of the courts, which by law will decide whether the defendants are innocent or guilty.1 It is stated that belonging to, participating in, being connected to, or appearing on a network, as analyzed herein, does not imply having committed a criminal act or being engaged in a criminal enterprise. It is always possible to belong, participate, be connected, or appear on a network as an agent promoting interests that are socially and institutionally beneficial, or as a result of coercion, among other reasons unrelated to criminal acts committed by the agent.

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The aim of this document is to present the social, economic and politic background of Colombia, as well as some characteristics of the legal and illegal markets for gold and Coltan. The document has four parts: The first one is a background to relevant characteristics of Colombia, the second part is an introduction to the characteristics of the extraction and trade of Gold in Colombia, the third section is a description of the exploitation and trade of Coltan in Colombia, and the final section includes some conclusions.

1. Background to Colombia

Colombia is a country with an estimated population of 48,93 Million, located in the northwest of South America. It is bordered by Panama, Venezuela, Brazil, Ecuador and Peru and by the Pacific Ocean and the Caribbean Sea, the latter with direct access to the Atlantic Ocean. The geographical location of Colombia is unique because of its access to two seacoasts, which explains why the country has several ports: seven in the Caribbean Coast (La Guajira, Santa Marta, Cienaga, Barranquilla, Cartagena, Golfo de Morrosquillo, Uraba and San Andres), and two ports on the Pacific Coast (Buenaventura and Tumaco).

Colombia's economy is mainly sustained on agricultural products, such as coffee, banana and flowers. Also, Colombia has the fourth largest petroleum production in Latin America and the most relevant exploited minerals are coal, gold, emeralds, sapphires and diamonds. In fact, The Economic Commission for Latin America[1] reported petroleum and coffee bonanzas[2] during the first semester of 2015.

Just during the decade of the 90s, Colombia opened its economy to join regional and global markets. Because of this political and economic change, and because of its natural richness, Colombia has been an attractive country for commercial trades: currently there are thirteen trades in force, being the free trade agreement with the United States the most relevant one the, considering its impact, not necessarily positive, in Colombian economy.

In 2014 the Colombian GDP was US$377,7 billion and the Colombian Gross National Income (GNI) was US$7,780, which means that Colombia belongs to the group of upper middle-income countries. Despite this classification, Colombia is a country characterized by

[1] Comisión Económica para América Latina, CEPAL.
[2] CEPAL (2015) Perspectivas económicas de América Latina. Available in: http://goo.gl/bhL2Wu
Revisión de la OCDE de las políticas agrícolas: Colombia (2015). Available in: http://goo.gl/yN3Wna

several problems regarding social and human rights. Although the national department of statistics informed a drop in the unemployment rates since 2011, reaching an 8,9 in May of 2015, the country still registers high levels of informal employment with 48,5% of its population in this situation for the same period. Also, the education is mainly funded by private sources, reaching a private funding of 35%, similar to Chile, the country in Latin America with the highest private financing (40%). A similar situation is observed in the health system.

According to the World Bank data, in 2013 the poor population in Colombia registered 33% the extremely poor registered 10%. Related to inequality, despite some advances in the last nine years, Colombia still exhibits high levels of income and wealth concentration compared with countries in the region. While the wealthiest population (the one in the 10th decile) holds 30% of income, the poorest (1st and 4th decile) holds approximately the 13%. Therefore, Colombia registers a worse position than the average countries in Latin America, where the 10th decide occupies a 32% of the national income while the 1st and 4th decile hold a 15%. These figures of inequality increase in the rural areas because of the also inequitable distribution of productive land "with an estimate 0.4% of the population owning 62% of the country's best land"[3].

According to its Constitution (1991), Colombia is a Rule of Law country, divided into 32 departments and organized as a democratic, unitary and decentralized republic with autonomous territorial entities. However, this decentralized structure has been used by criminal structures in order to gain local power. Colombia has been defined as a political stable country because of its lack of dictatorships; however, the country has been in different internal conflicts since the 50s: (i) The bipartisan violence of the two traditional political parties (conservative and liberal) beginning in the 50s; (ii) the violence generated by left armed groups that fought for an agrarian reform since the 60s, and (iii) the current conflict that started in the 80s, in which radical right paramilitaries and drugs traffickers participate.

[3] USAID Country Profile. Property Rights and Resource Governance. Available in: http://goo.gl/cxYh8

2. Armed conflict, victim rates and regular crime in Colombia

Historically, Colombia has exhibited high levels of crime rates because of its internal armed conflict. During the 50s and the 60s, the violence was intense in peripheral territories where productive lands were in dispute. That is why the first guerrillas appeared in the 60s: the Revolutionary Armed Forces of Colombia (FARC), the National Liberation Army (ELN) and the Popular Liberation Army (EPL) pretended to protect the peasant's demands.

During the 80s, the country experienced the radicalization of guerrillas, which adopted an offensive strategy to overthrow the government. As a result, the military fronts of each guerilla group got multiplied. In the meanwhile, paramilitary and "self-defense" militias were established and funded by landowners, local elites, and drug traffickers, to gain control of territories dominated by the guerrillas.

Since the involvement of paramilitary groups, drug traffickers and guerrillas, the figures of violence increased during the three decades of 1985 – 2012, being the most violent period in Colombian history. As shown below, the following are some figures on victims caused by armed conflict (with July 2015 as the cut-off year):

- Homicides reached 944,626 people. The authors for at least 60% of the slaughters in Colombia are paramilitaries, while the guerrillas are responsible for the 17.3%.
- Victims of forced disappearances reached 25,077 people. This is a common modality of action of the paramilitary militias, which usually includes burying victims in mass graves or throwing them into rivers.
- The forced displaced population reached 6,300,422 people, one of the highest rates of internal displacement in the world. Displacement has been greater in regions with natural resources or agricultural potential. Afro-Colombian population constitutes approximately 30% of displaced people, with a majority of women.

Figure 1. Disaggregated victimizing events 1985- July 2015

Fact	People
Forced abandonment or dispossession of land	8.210
Terrorist act / Attacks / Fighting / Harassment	84,652
Threat	246,921
Crimes against freedom and sexual integrity	10,540
Forced disappearance	156,583
Displacement	6,300,422
Homicide	944,626
Landmines / UXO / Explosive device	13,112
Loss of real or personal property	95,082
Kidnapping	39,804
No information	39
Torture	9,570
Recruitment of Children and Adolescents	7,720

Source: Registro Único de Víctimas (RUV) – Government of Colombia. http://rni.unidadvictimas.gov.co/?q=node/107

Figure 2 discriminates the number of victims by victimizing events and perpetrators. Surprisingly, the Public Force is responsible for targeted killing, attacks on civilian property and slaughters. Some of these facts are currently known as "false positives", political killings or with the concerted participation of paramilitaries.

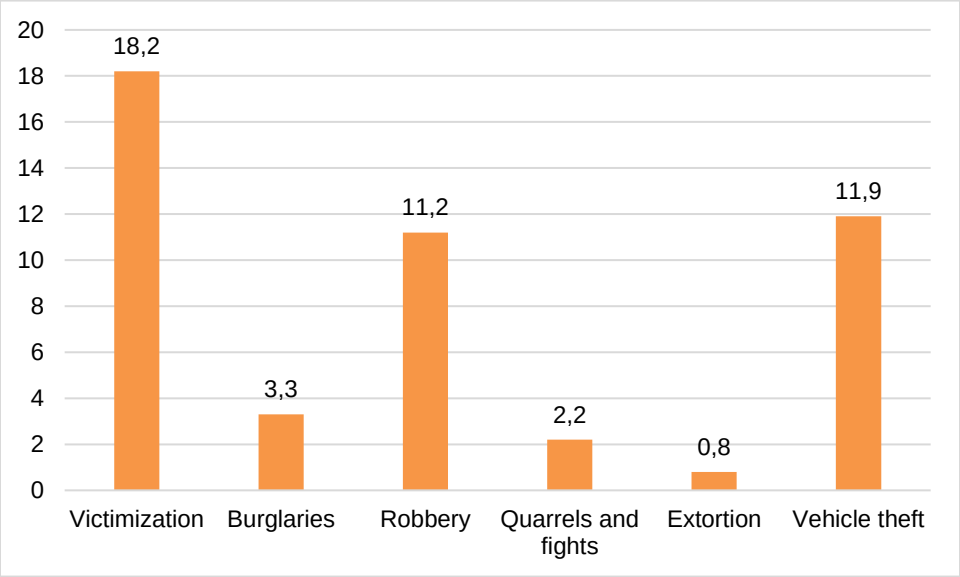
Figure 2. Number of Victims by Victimizing Event by Perpetrator, 1970-2012

Facts	Number of victims			
	Guerrillas	Paramilitaries	Public Force	Not identified armed groups
Kidnapping	24,482	2,541	0	0
Targeted killing	3,899	8,903	2,399	6,406
Attacks on civilian property	4,323	270	182	308
Terrorist attacks	77	2	0	16
Slaughters	343	1166	158	295

Source: Centro Nacional de Memoria Histórica. Available in: http://goo.gl/z73UA3

Regarding national crime rates different to those related to the armed conflict, in the period 2013-2014 an 18,2% of the population above 15 years reported that they faced at least one felony in 2013. While 3.3% of the households in the 28 Colombian cities suffered burglary, in the robbery case the figure was 11.2%. Also, 11,9% of car's owners informed being victims of car theft. Other crimes can be seen in the graphic:

Figure 3. Crime Victimization Rates (%). The population of 15 years and more. Total 28 Colombian cities



Source: National Administrative Department of Statistics, DANE. Coexistence and Citizen Security Survey – 2013-2014. Available in: http://goo.gl/cYXiFj

Complex criminal networks in Colombia

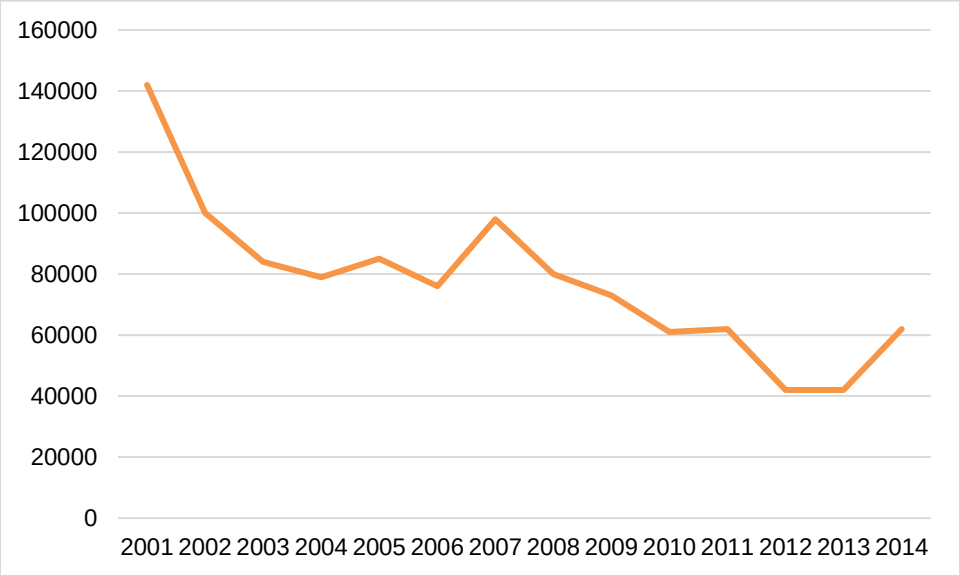
Organized crime escalated in Colombia during the 80s with the violence generated by the Medellin and Cali drug trafficking cartels. Although smuggling is longstanding in Colombia, cocaine trafficking excelled at that decade with Pablo Escobar (Medellin Cartel) and the Rodríguez Orejuela brothers (Cali Cartel). Currently, however:

> […] The level of urban violence observed in the 80s and the 90s, is no longer of the quality seen when Pablo Escobar ruled drug trafficking around the world. Bombs are not exploding in crowded malls, in buildings or on airline flights. No drug lords such as Pablo Escobar are

as famous these days; no cartels like the Medellín or the Cali cartels are ruling world drug trafficking[4].

Certainly, it can be said that Colombia's security has improved and international cooperation has been essential in this regard: for instance, Plan Colombia, an agreement established in the 90s between the United States and Colombia, tried to weaken the drug trafficking -and thus the guerrilla- by assigning specialized counternarcotics battalions and spraying illicit crops while also allocating resources to social programs. Although the illicit crops dropped significantly (see figure 4), it has been documented that these crops spread to other regions inside and outside Colombia[5].

Figure 4. Coca Fields 2001-2014 (hectares)



Source: UNODC. Colombia. Monitoreo de Cultivos de Coca. Available in: http://goo.gl/7mYC5Q

Likewise, the guerrilla's military actions have decreased not only as a result of *Plan Colombia*, but also by the widely known and criticized security policies enforced since 2002 by former president Alvaro Uribe. As a matter of fact, Uribe has been accused several times by national and international organizations for having allegedly sponsored the creation of

[4] Garay, L.G., Salcedo-Albarán, E. (2015) Drug Trafficking, Corruption and States: How Illicit Networks Shaped Institutions in Colombia, Guatemala and Mexico. IUniverse.

[5] Chernick, Marc (2010) "Repensando El Plan Colombia 10 Años Después." *El Espectador* newspaper. Available in: http://goo.gl/ste0sD

paramilitary groups[6]. In 2006, as a result of peace dialogues between the paramilitary group AUC –United Self-Defense Forces of Colombia- and the Uribe's government, these groups were demobilized. However, "organized criminal groups remain an important source of instability in Colombia, having mutated and fragmented in response to government pressure. Former paramilitary fighters […] are important actors in the new manifestations of organized crime"[7].

In fact, there are at least a dozen major criminal groups still operating in Colombia: the FARC and ELN guerrillas; the former paramilitaries reorganized in criminal groups known as "Rastrojos", "Paisas", "Oficina de Envigado", "Urabeños" and the ERPAC[8], and several smaller drug trafficking organizations. These groups focus on producing, storing and shipping illicit drugs and other contraband kinds. The participation of several criminal groups has generated transnational criminal networks far more complex than its predecessors, the Medellin and Cali cartels, or the AUC paramilitaries.

As mentioned above, Colombia's geographical location makes it a criminal hotspot for contraband and various illicit activities. As a result of the access to two oceans, to Central America and to four bordering countries: "Colombia is the gateway to south America. Three extensive mountain ranges also give criminal groups ample space to move, store and produce illicit drugs"[9]. Historically, armed groups, either guerrillas or paramilitary militias, have taken large advantage of these features in different modalities. While the Medellin and Cali Cartels used to purchase coca paste in Peru and Bolivia, when these Cartels were disarticulated, a boom in coca production started. Currently, regions like Putumayo, Norte de Santander, north central Antioquia, the northern coast and the Sierra Nevada de Santa Marta became centers for coca production because of their proximity to Ecuador, Venezuela, Panama and the Caribbean (see Figure 5).

Nowadays, the criminal networks exploit new international markets while diversifying routes to non-US destinations, such as European and African countries. Also, the growing role of Mexicans drug traffickers, which increased agreements with Colombian drug traffickers,

[6] *Semana journalistic* magazine. (2013) "Fantasma del paramilitarismo ronda a Uribe". Available in http://goo.gl/2wksyg
[7] Arnson, Olson and Zaino (2014). *Two Struggles: Confronting Crime and Violence in Mexico and Colombia.* Available in: http://goo.gl/4U9FU9
[8] Popular Revolutionary Anti-Terrorist Army of Colombia.
[9] *InSight Crime.* Organized Crime in the Americas. Colombia Profile. Available in: http://goo.gl/A7FDBf

strengthened criminal groups in Colombia and Central America in the cocaine trade towards the US and Europe markets[10]. Other recent changes include the raising of domestic consumption of cocaine and its derivatives in Colombia, Brazil, Argentina, Chile and Peru[11]. Besides, criminal networks participating in other illegal activities such as extortion, gold mining, micro-trafficking, gambling, contraband smuggling and human trafficking.

[10] Garay, L.J., Salcedo-Albarán, E. (2015). *Drug Trafficking, Corruption and States: How Illicit Networks Shaped Institutions in Colombia, Guatemala and Mexico.* Iuniverse

[11] Arnson, Olson and Zaino (2014). *Two Struggles: Confronting Crime and Violence in Mexico and Colombia.* Available in: http://goo.gl/Mdzb6c

Figure 5. Political Map of Colombia

Source: Instituto Geográfico Agustín Codazzi, IGAC. Available in: http://goo.gl/o1kHtG

3. Extraction and trade of Gold in Colombia

The route of illegal gold trafficking in Colombia begins in a wooded area of difficult access in the Bajo Cauca in the department of Antioquia, where the majority of illegal mines are concentrated (see figure 6). The metal is extracted from mines around the towns Ayapel, Cáceres, Tarazá and Nechí, and then it is transported to the town of Caucasia and Medellin to be melted into ingots. In the last stage, the latter are sent to Panama, United States and Europe[12].

Figure 6. Departments' percentage of participation affected by alluvial gold mining, 2014

Departamento	%
Antioquia	36
Chocó	31
Bolívar	13
Cauca	4
Nariño	4
Córdoba	3
Valle	3
Putumayo	2
Otros	4

Source: UNODC. Colombia. Monitoreo de Cultivos de Coca. Available in: http://goo.gl/2xvhma

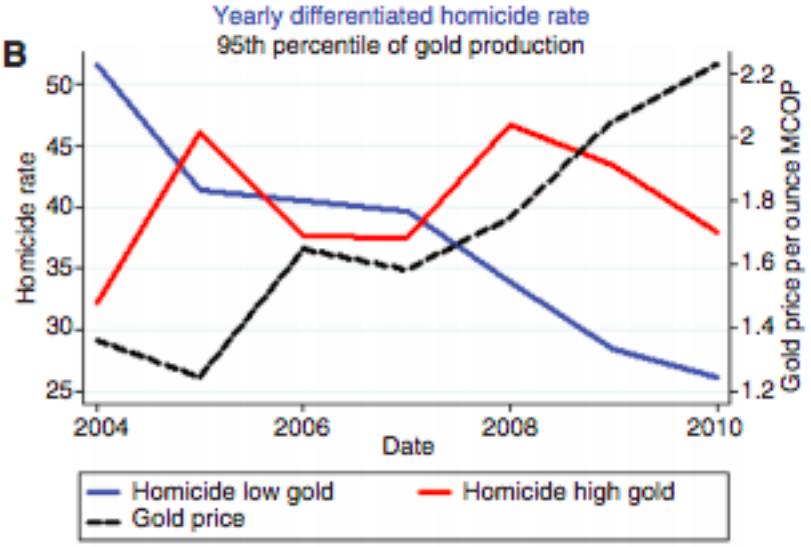
The illegal mining is practiced in 233 towns of Colombia and the 60% is related to gold exploitation. According to information produced by the Mining National Agency,[13] while one kilo of coca costs approximately COP $4 million –the equivalent to US$1460[14]- the same amount of gold costs between COP $80 and COP $90 million –US$29,218 and 32,870[15]. That is why gold is sometimes referred as the "new Colombian coca". This also explains why armed groups are currently participating in this illegal business: in 81 of those 233 towns the presence of the FARC, ELN and criminal bands is a fact[16].

[12] *El Espectador* newspaper (2012). *Las rutas del contrabando de oro en colombia*. Available in: http://goo.gl/2IzSig
[13] *Agencia Nacional de Mintería*, ANM.
[14] Exchange currencies COP to USD for the third week of July, 2015.
[15] Exchange currencies COP to USD for the third week of July, 2015.
[16] *Semana* journalistic magazine (2015). *La guerra contra la minería ilegal criminal en Colombia*. Available in: http://goo.gl/cMufCz

According to some studies, the rise in illegal mining is associated to increase in homicide rates and the number of victims of massacres perpetrated by illegal armed groups. As can be seen in the Figures 7 and 8, there is an apparent statistical and geographical relation between homicides and gold production[17]. This result is consistent with media reports:

> "The fall of big capos, the decreasing of coca crops, the loss of routes and other factors that affected the drug trade, allowed illegal actors to find very profitable and 'safe' mining alternatives, an activity that brings alternative activities that generate dividends, such as extortion.[18]

Figure 7. Yearly differentiated homicide rate 95th percentile of gold production

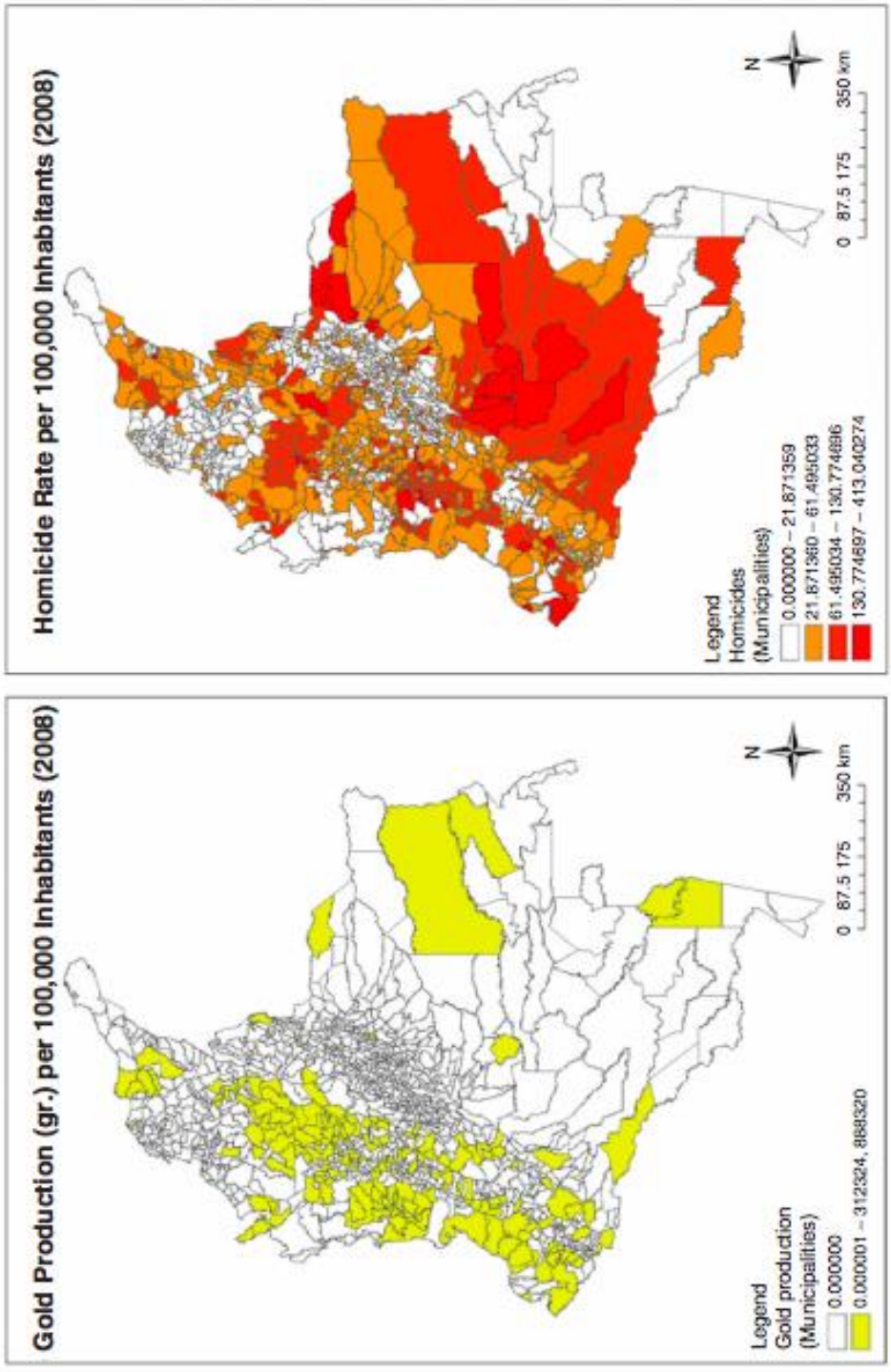


Source: Idrobo, Mejía, and Tribin (2014) "Illegal Gold Mining and Violence in Colombia."

[17] Idrobo, N., Mejía, D., Tribín, A. (2014) "Illegal Gold Mining and Violence in Colombia". *Peace Science and Public Policy* 20 (1). 83-11

[18] *Semana* journalistic magazine (2015). *La guerra contra la minería ilegal criminal en Colombia*. Available in: http://goo.gl/wDuR5y

Figure 8. Gold production and homicide rate per 100,000 Inhabitants,2008



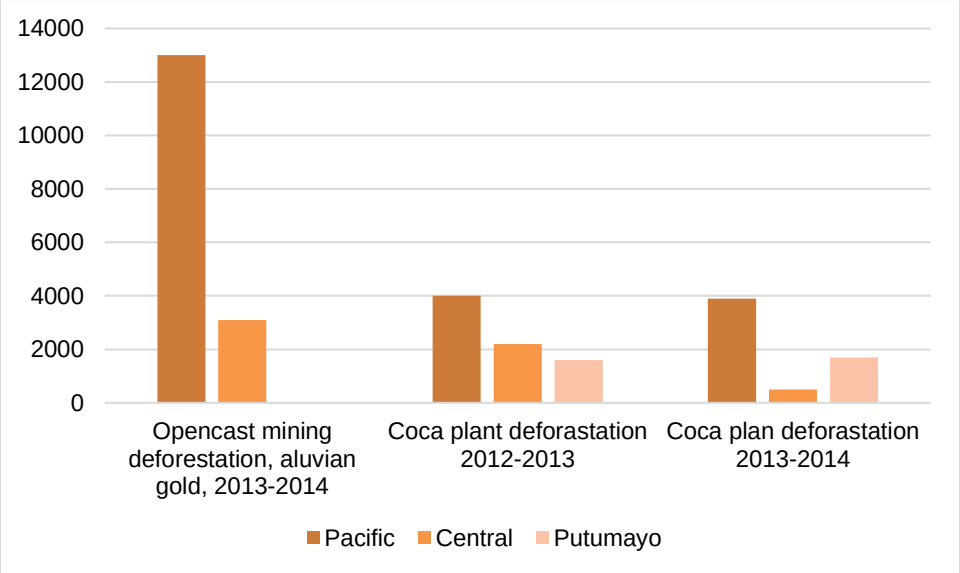
An illegal mine extracts at least a pound of gold weekly, which is sold at the lowest price of COP $32 million. For those participating in this illegal activity, the investment is usually smaller when compared to the profits.[19]

Not only the illegal workers benefit of the gold rents. In the zones where the FARC, ELN and the BACRIM operate, extortion[20] is paid to those groups: COP $5 million per month (US$1793) for installing a backhoe in an gold zone; COP $2 million (US$717) per month for allowing these machines to operate; and COP $3 thousand must be paid (US$1.08) for every gallon of fuel that enters into the exploitation area. Individual workers also pay: a "*barequero*" or artisan miner can earn COP $1 million monthly, but he or she must pay weekly one Castilian (4,8 gold grams), which means COP $320 thousand (US$114)[21].

Illegal gold mining has caused also a strong environmental damage. More than 90 rivers, including the most relevant ones in Colombia, like the *Cauca* or the *Magdalena*, have turned out contaminated due to gold exploitation with materials like mercury. This metal hampers the potable water and obstructs fishing activities. Also, huge zones have been deforested and forests that protected riverbeds and gave habitat to small reptiles, birds and other species have disappeared. The land, in the meanwhile, is currently characterized by huge craters[22]: "*In the Pacific 13,600 hectares of primary forests have been destroyed in order to advance with mining activities, just three times of what was cut to plant coca during the 2012-2013 period*"[23].

[19] For instance, purchasing a backhoe requires an investment of COP $500 million on average (US$170,329); the backhoe's owner receives 1,6 million pesos (US$358) per day when renting it and an operator earns COP$ 2 million monthly (US$717). The cost of the machine is therefore easily paid in the first year of use.
[20] Or "vaccination", as it is locally known.
[21] *El Espectador* newspaper (2012). *Las rutas del contrabando de oro en colombia*. Available in: http://goo.gl/Vbyk4U
[22] *El Tiempo* newspaper (2015). Sobrevuelo destapa las 'ruinas' por fiebre de oro. Available in: http://goo.gl/lzL95y
[23] UNODC. Colombia. Monitoreo de Cultivos de Coca. Available in: http://goo.gl/p06Axj

Figure 9. Deforested Primary Forests related to Open Pit Mining Activities and Coca Crops



Source: UNODC. Colombia. Monitoreo de Cultivos de Coca. Available in: http://goo.gl/p06Axj

Legislation and the role of Colombian Police

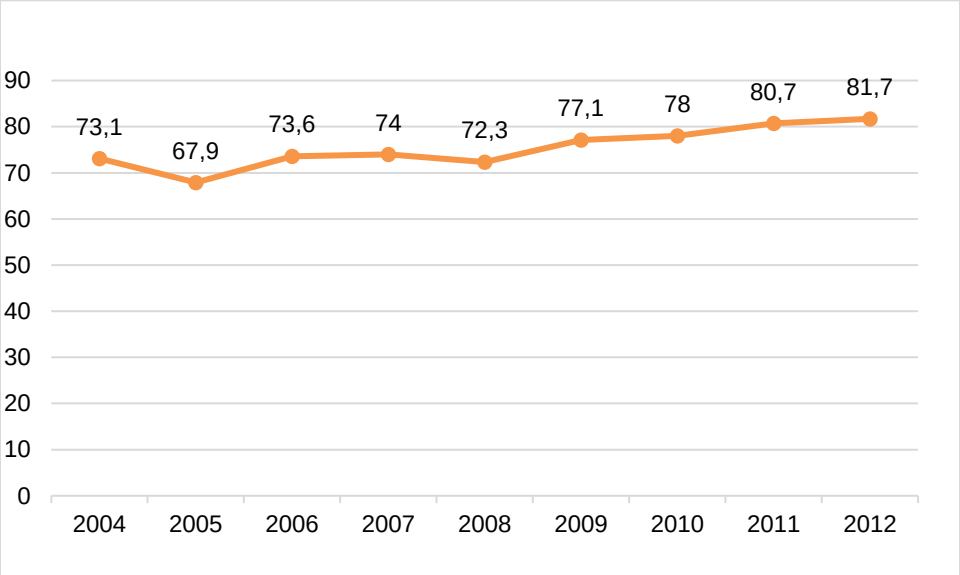
The Public Force of Colombia is integrated by the Military Forces -National Army, Air Force and Navy- and the National Police, both of them ascribed to the Defense Ministry. The National Police is in charge of the Directorate of *Carabineros* and Rural Security -DICAR, which in turn lead the National Unity Against Illegal Mining and Anti-Terrorism –UNIMIL- recently created in 2014.

Before the UNIMIL was created, the Energy and Mines Ministry, the Defense Ministry and the District Attorney's Office of Colombia created an intelligence center to fight against illegal mining. In October of 2014, an especial group of military and police executed the "Troya Plan" in the northeast of Antioquia to fight illegal mining and the violence that surrounds this activity. Between January 2010 and March 2015, the Police conducted 881 operations against 2,733 illegal mines: in this period, 7,419 people have been arrested, 176 backhoes were destroyed, another 1,352 were seized and 839.5 kilos of illegal gold were seized. Currently, there are 44 national criminal networks investigated for illegal mining[24].

[24] *Semana* magazine (2015). *La guerra contra la minería ilegal*. Available in: http://goo.gl/d0b2sf

Despite the results, some figures reveal a lack of trust in the police, since a 30% of the population in 2012 believed the Police participated in crimes. Likewise, a 60% of the population perceives the corruption in the country as “very generalized”[25]. That same year Colombia also had the highest perception of corruption with an average of 82 points on a scale from 0 to 100, which was the highest score in a permanent increase of perceived corruption since 2008 (see figure 10).[26]

Figure 10. Perception of corruption in Colombia, 2004-2012



Source: LAPOP (2012). Available in: http://goo.gl/7HyfXD

These measures have not been exempt from political and social tensions. For instance, Colombian legislation regarding how to exploit gold mines is ambiguous, which implies that usually Armed Forces persecute and capture illegal workers, and seize the illegal gold, but

[25] Latin America’s Public Opinion Project, LAPOP (2012). *Political Culture of Democracy in Colombia and in the Americas, 2012: Towards Equality of Opportunity*. Available in: http://goo.gl/MU56pA

[26] These perceptions have been fueled by violent acts in which the public force is responsible. For instance, in 1997 the slaughter that happened in the municipality “El Aro" lasted seven days and was perpetrated by 150 men of the Self-Defense Peasant Forces of Cordoba and Uraba (ACCU). This mass murder was announced one year in advance and when it finally happened the security forces did not attend the population calls requesting help. In this slaughter 17 peasants were murdered and tortured, 42 of the 60 homes in this town were burnt, 1,200 cattle were stolen and 702 inhabitants were displaced. The Inter-American Court of Human Rights –CIDH- condemned the Colombian government for its responsibility in the violation of the right to life, liberty, personal integrity, to property, etc.; Likewise, in this sentence it was acknowledged the acquiescence, tolerance and participation of the security forces in this massacre.

then the judges release them. The poorest workers are usually the most affected in these processes, in which local urban Police in towns confiscate work tools of the "*barequeros*".

Indeed, in the second half of 2013, a decree issued by the Government in late 2012 authorized enforcement agencies to destroy facilities, machinery and informal mines, which caused several social protests. Hundreds of small miners marched against the decree for 45 days, complaining that the government "criminalizes" artisanal miners by defining them as members of armed groups and also claiming that the legislation subordinates them to large mining companies[27].

4. Extraction and trade of Coltan in Colombia

Strategic Minerals

Chemical elements or compounds of elements such as Nb (niobium), Ta (tantalum), W (tungsten), Ga (gallium), Ge (germanium) and Rare Earth Elements (REE) play a decisive role in the development of tech industry. Since a little more than half a century Tantalum and niobium became critical to modern technology because of their characteristics. In particular in combination with metallic tantalum, tantalum oxide is important for its high capacity to store and release electrical charges, allowing to design thinner and smaller capacitors. In turn, it is used to manufacture the vast majority of electronic components of new technologies: mobile phones, computers, video game consoles, microprocessors, satellites, GPS, weapons, prosthetics and medical implants and climate monitoring systems. This however, does not mean that these minerals are used in the regions where they are exploited: "Although in Colombia tech products in microelectronics, metallurgy and steel are imported and used, the theoretical and practical knowledge about these materials is scarce. They are regarded as strategic minerals containing these elements in exploitable quantities".[28]

[27] Fundación Ideas para la Paz, FIP. (2014). *Dinámicas del conflicto armado en el Bajo Cauca antioqueño y su impacto humanitario.* Available in: http://goo.gl/PF6Yz0

[28]Cramer, T., Z. Amaya, J. Franco, A.Bonilla y A.Poveda (2011) *Caracterización de depósitos aluviales con manifestaciones de tantalio y niobio ("coltán") en las comunidades indígenas de Matraca y Caranacoa, Departamento del Guainía*. Bogotá: Contrato interadministrativo INGEOMINAS-Universidad Nacional de Colombia. Available in: http://goo.gl/fJ8GYl

Figure 11.

Source: Tantalum-Niobium International Study Center, TIC. Hitachi AIC, Tantalum capacitor tape reels (Kazuyuki Iida). Available in: http://tanb.org/tantalum

Coltan and its most valuable mineralizations

The German mineralogist and professor at the National University of Colombia, Thomas Cramer, explains that "Coltan" is not a mineral, but a term, alias or business abbreviation originally used in Africa, that refers to a number of minerals that include the elements tantalum (Ta) and niobium (Nb) in high concentration. In fact, more than 70 mineralizations containing these elements with different chemical compositions and crystal structures have been identified.[29]

The most important and valuable mineralization of tantalum and niobium are *tantalite* and *columbite*. Tantalite is a tantalum oxide compound with iron and manganese [(Fe, Mn) Ta2O6], and columbite is composed of niobium oxide, iron and manganese [(Fe, Mn) Nb2O6]. Niobium, also known as columbium especially in the United States, has another significant mineralization: the pyrochlore [(Na, Ca) 2Nb2O6 (OH, F)], which is formed mainly in carbonatites rocks. Columbite-tantalite or *ferrocolumbite* is an ore containing higher niobium and fewer amounts of tantalum while tantalite-columbite has fewer niobium and higher amounts of tantalum. In fact, "*there are 30 tantalum and niobium ores with economic potential, like ixiolita, strüverita or wodginita, all oxides of Nb and Ta with additional elements*

[29]Marín Villar, Camilo (2010) *Desmitificando el "Coltán"*. Revista Metal Actual. No. 16. Available in: http://www.metalactual.com/revista/16/materiales_coltan.pdf

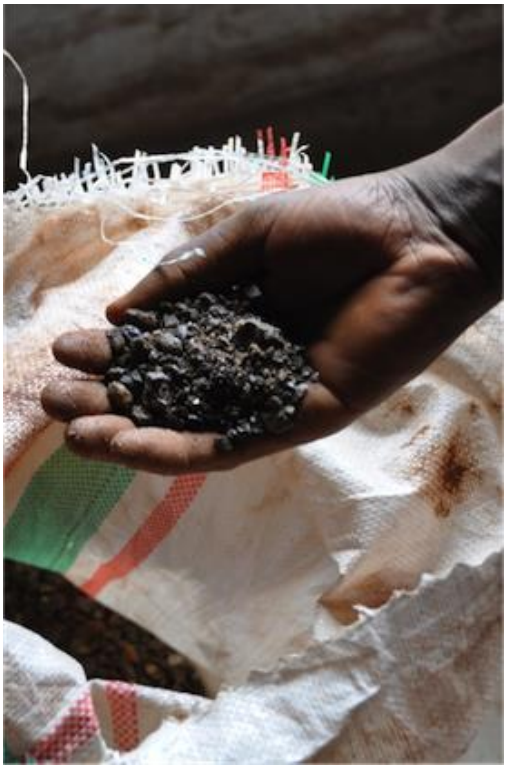
in different crystal structures and also accompanied by abundant minerals like ilmenite and rutile. A variation of similar minerals was found in pegmatites in Brazil as well."[30] In nature, the elements forming these minerals are combined and usually one predominates over the other.

Tantalum and niobium

As previously stated, Coltan, also known as "blue gold", is the informal abbreviation for columbite and tantalite, but this name is also used for other minerals containing tantalum and niobium. However, to refer appropriately to these mineralizations, we must talk about tantalum and niobium particularly. Tantalum and niobium are refractory metals, which means that they have a high melting point and can withstand high temperatures: 3.017ºC and 2.468ºC respectively. The heat resistance of the Tantalum is twice that of iron and is surpassed only by *tungsten* and *rhenium*. Accordingly, the Tantalum and niobium have the potential to be used in resistant applications to high temperatures. Besides, tantalum carbide (TaC) withstands 3.880ºC and has a similar hardness to diamonds.

[30]Cramer, T., Z. Amaya, J. Franco, A.Bonilla y A.Poveda (2011) *Caracterización de depósitos aluviales con manifestaciones de tantalio y niobio ("coltán") en las comunidades indígenas de Matraca y Caranacoa, Departamento del Guainía*. Bogotá: Contrato interadministrativo INGEOMINAS-Universidad Nacional de Colombia. Available in: http://goo.gl/7K6fxH

Figure 12. Illustration of "rare minerals".



Source: Tantalum-Niobium International Study Center, TIC. Coltan from artisanal mining (Karen Hayes). Available in: http://tanb.org/coltan

Despite the category of "rare minerals", tantalum "ranks place number 53 and niobium ranks place number 32 in natural abundance among the elements in Earth's crust; that is to say, they are relatively common compared to gold, for example, which ranks place number 75." [31] This means that there "is between 1 and 2 grams of Ta, 20 of Nb and only 0.004 of gold for each ton of earth's crust".[32]

Regarding niobium, the largest producers are Brazil, Nigeria and Australia. The largest deposit of pyrochlore, the main ore obtained from niobium, is located in Brazil in the area of Araxá and is owned by the Brazilian Company of Metallurgy and Mining, CBMM.

A report from the Tantalum-Niobium International Study Center, TIC, headquartered in Belgium, indicates that global reserves of niobium, 460 million tons, are sufficient to meet demand for the next 500 years. In addition, the appellative of "blue gold" usually is vague,

[31] Marín Villar, Camilo (2010) *Desmitificando el "Coltán"*. Revista Metal Actual. No. 16. Available in: https://goo.gl/q5qkoE
[32] Ibid.

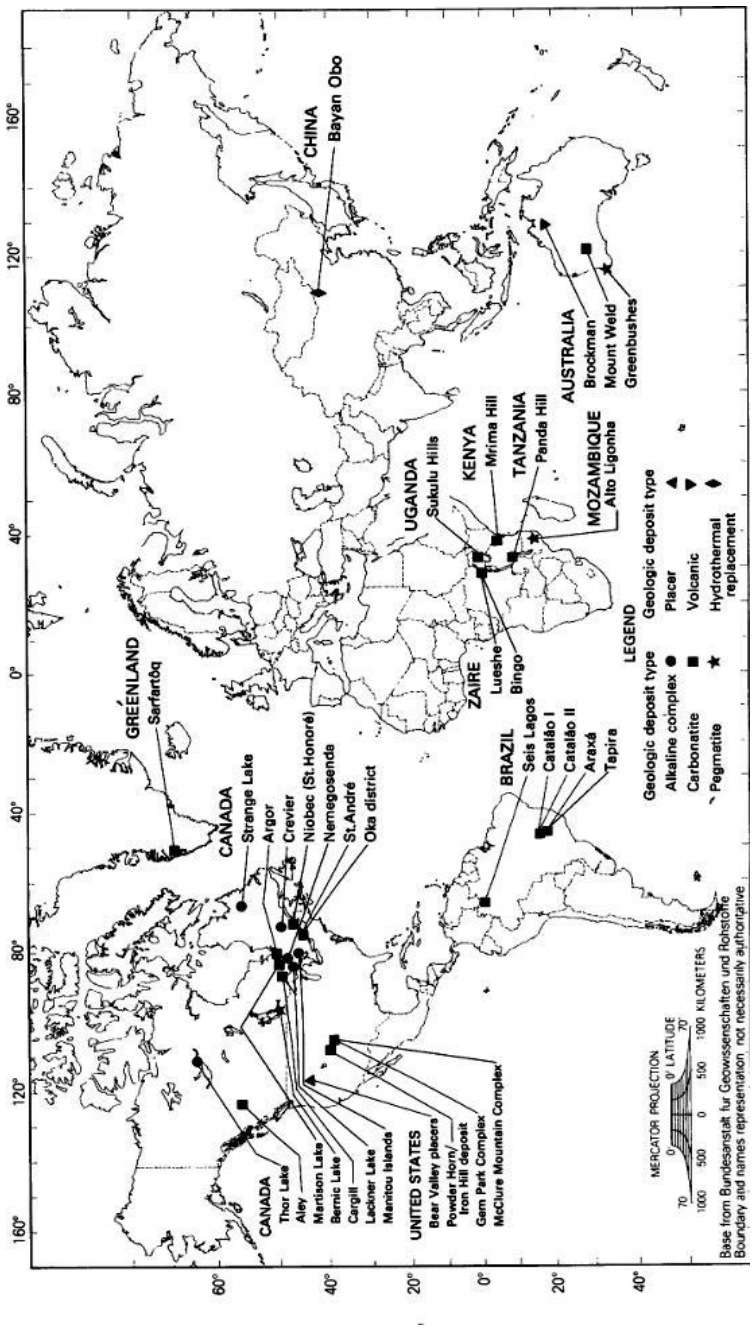
because while one kilogram of gold costs about USD $30,000, one of tantalum oxide is purchased just for USD $80, while the Ferro-Niobium between USS $13 and USS $20, according to the Federal Institute for Geosciences and Natural Resources, BGR, located in Hannover, Germany.

The boom of Coltan in Colombia

Local and foreign media have explained that The Democratic Republic of Congo, DRC, has the 80% of the worldwide reserves of coltan, meanwhile Australia, Brazil, China, Venezuela, Bolivia and Colombia have the remaining percentage. Colombia "*claims to control 5% of the world's reserves*", reported the International Consortium of Investigative Journalists, ICIJ. Nevertheless, anthropologist Jhonnatan Fernando López Vega maintains that the global information about the resources and reserves of tantalite is not efficiently evidenced, therefore recent estimations of tantalite, as raw material, fluctuate between 120.000 and 150.000 tons, identifying 40% of resource in Brazil, 21% in Australia, 16% in countries from Central and southeastern Africa (Ethiopia, Nigeria, Mozambique, Burundi, Rwanda, Democratic Republic of the Congo, DRC, and others), 10% in China and Southeastern Asia (Malaysia), 10% in Russia and the Middle East (Egypt and Saudi Arabia), 2% in North America (Canada and United States) and 1% in Europe (Finland).[33]

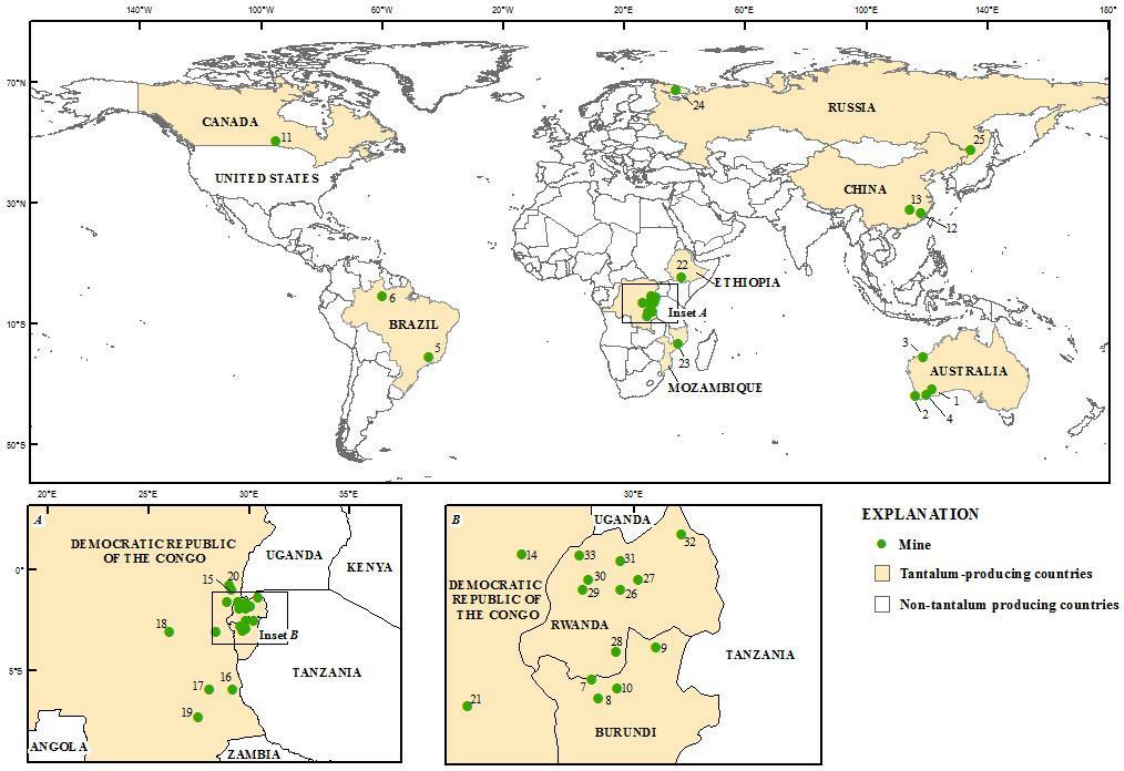
[33] López Vega, J. Fernando. 2014. *Falsa bonanza, reestructuración territorial y movilización interétnica en el río Inírida, Guainía, Colombia.* Bogotá: Universidad Nacional de Colombia. Available in: http://www.bdigital.unal.edu.co/46325/1/869063.2014.pdf

Figures 13. Deposits of Nb y Ta



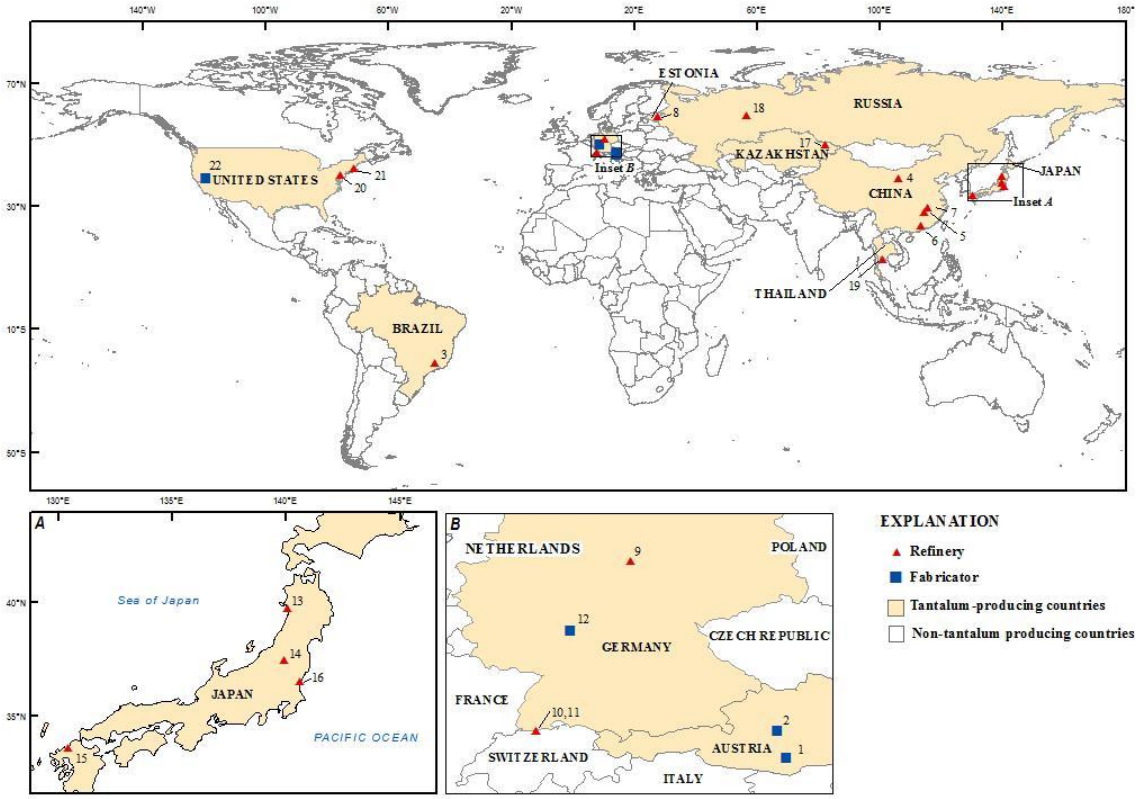
Source: U. S. Geological Survey Circular. 1993.

Figure 14. Significant tantalum (Ta) mines in the world



Source: US Geological Survey Open-File Report.2013. Available in: http://pubs.usgs.gov/of/2013/1239/.

Figure 15. Prospective tantalum (Ta) producers in the world



Source: US Geological Survey Open-File Report.2013. Available in: http://pubs.usgs.gov/of/2013/1239/.

Thus, López Vega asserts that many countries in Sub-Saharan Africa have reserves of tantalite, but not more than 16%. According to López Vega, with the exception of Brazil, there are not proved references of new reserves in Latin-American countries so far[34].

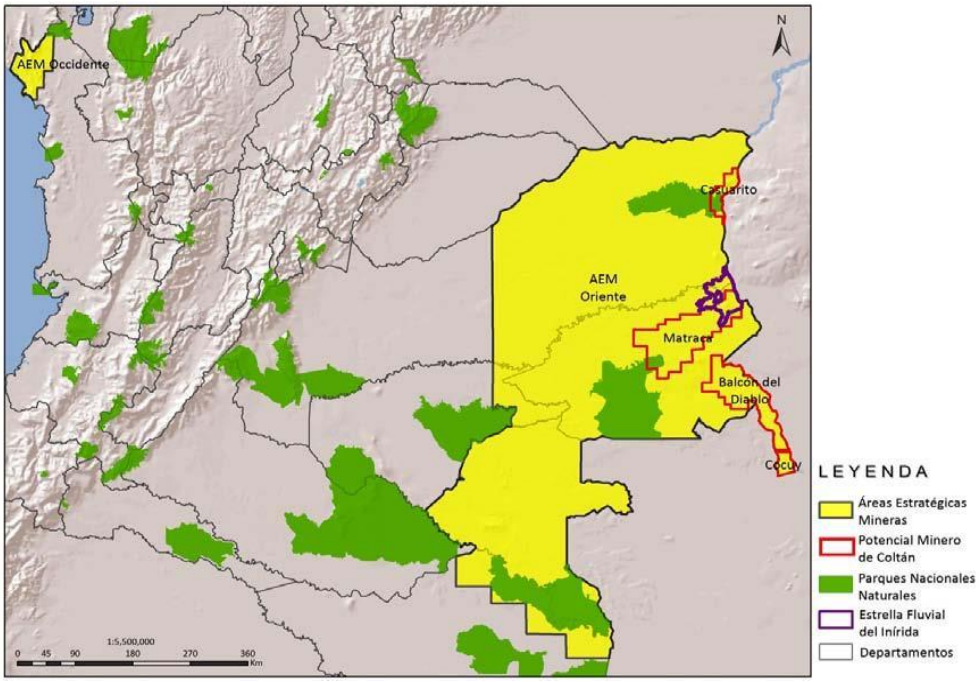
Lack of geological studies

Until 2009, the vast majority of Colombians were not related to the concept of "coltan"; there were no previous references, with the exception of newspaper articles that mostly replicated international news on armed conflicts in Africa related to the mining of these and other minerals. In general, it was often informed that coltan mining was located in east regions of Colombia, with "*evidence of deposits of the ore in the Orinoco, mostly in Vichada, Guainía,*

[34] López Vega, J. Fernando (2014) *Falsa bonanza, reestructuración territorial y movilización interétnica en el río Inírida, Guainía, Colombia.* Bogotá: Universidad Nacional de Colombia. Available in: http://www.bdigital.unal.edu.co/46325/1/869063.2014.pdf

and Vaupés"[35]. As the Wall Street Journal informed, "*Colombia's southeastern Amazon jungle is the place where much of the illegal coltan mining takes place*".[36]

Figure 16. Potential mines of coltan: Vichada (Casuarito) and Guainía (Matraca, Balcón del diablo y Cocuy).



Source: SGC 2012b, parte integral de la Resolución 0045 del 2012**.**

In 2009, the *Agence France-Presse* informed about Hugo Chávez, former president of Venezuela, stating: "It appeared a strategic mineral called coltan. We took military control of the area because of smuggling of the ore to Colombia". However, López Vega argues that maybe "without knowing the quality of the deposit, the Venezuelan army deployed Blue Gold operation in order to combat drug trafficking and tackle the illegal mining in the border states of Bolivar and Amazonas".[37]

[35] Revista Semana (2009) *La Guerra por el coltán.* Available in: http://goo.gl/UINiIr
[36] Dan Molinski. 2012. *Colombia to Wage Battle Against Illegal Coltan Mining.*The Wall Street Journal. Available in: http://goo.gl/Y4LTLu
[37] López Vega, J. Fernando. 2014. *Falsa bonanza, reestructuración territorial y movilización interétnica en el río Inírida, Guainía, Colombia.* Bogotá: Universidad Nacional de Colombia. Available in: http://www.bdigital.unal.edu.co/46325/1/869063.2014.pdf

Figure 17. Illegal coltan mining on both sides of the Venezuela-Colombia border

Source: The Center for Public Integrity. Available in: http://goo.gl/9kJRXc

It is possible that a false boom of the ore has triggered a wave of mining activities of coltan, which are illegal to a greater extent.[38] As it happens with gold mining, inhabitants quickly became "miners" of coltan. They mine the ore digging large craters in stream beds to expose the hidden mineral. Men sift through gravels along streams, and then they wash the ore in water and mud in washtubs, so the coltan sinks on the bottom. This is a process lacking regulation and it usually escapes controls by Colombian police, even when patrols agents are often "*looking for traffickers moving contraband or containing valuable minerals like coltan and tungsten*"[39].

In general, there are no official studies determining the zones of production of coltan, reserves, mining methods or regulations of taxes in Colombia. In fact, there are no official geological studies that analyze the existence and concentration of "coltan" in Colombia. However, the first study that indicated the chance of finding niobium and tantalum in the regions of San José del Guaviare and Cumare hill was the "Radargamétrico Amazon"

[38] Gómez, Ignacio (2012) *Colombia's black-market coltan tied to drug traffickers, paramilitaries.* The Center for Public Integrity. Available in: http://www.publicintegrity.org/node/8284 According to Mauricio Cárdenas, chief of Colombia's Mining Ministry, illegal mining activities of coltan take place in remote areas where police cannot access. For instance, there is a mine inside Puinawai National Park in Guainía where "natives bring nearly 50 pounds of ore inside palm-frond baskets, anchored to their backs by a cloth wrapped around their foreheads"
[39] Ibid.

Project. In 1986, two studies indicated the chance of finding phosphates and mineral of tantalum and niobium in deposits of Puerto Carreño, Vichada.[40]

Finally, in 2006 another study[41] compiled previous studies by Ecopetrol,[42] Cogema and Enusa. Its researchers analyzed thousands of samples that allowed to identify anomalies with appreciable values of niobium and low values of tantalum; they found higher values in sections of the rivers Querari and Vaupés in Vaupes state, followed by values in the rivers Tomo, Tuparro and Meta in Vichada state, and the lowest in Inírida River of Guainía.[43]

Mineral trafficking and armed conflict

There is no regulation for exploration and extraction of coltan and "Coltan SAS" is the only legal company with an official license to commercialize this group of minerals in Colombia: "*There is only one license, obtained in 1995, for exploiting coltan in the country (…). That year, Rafael Alberto Rodríguez Forero won the right to exploit a plot called El Caney de los Cristales, near Puinawai wildlife preserve and the Guaviare River*".[44]

In order to purchase and sell coltan, illegal traders have used false records or small titles, legally granted, that have been used as havens for the legalization of illegal coltan mining activities, "*thus not just violating Colombian law, but potentially breaking international trade rules set by the United Nations*"[45]. Those traders use small boats for picking up the mineral, which is sent to Bogotá to reach the legal trade that feeds high-tech manufacturers. Police and soldiers from Guainía point out that coltan is also transported to and from Venezuela in pangas and motor boats.

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[40] "In 1998, Pedro Lopez Africano described in Caño Maimachi, Caño Lata and in the road between Caño Minas and Caranacoa, small fragments of black crystals, between 2 and 4 millimeters in diameter, sub-rounded, with metalloid brightness, irregular fracture and below the quartz hardness; identified as (…) minerals belonging to the series of tantalite-columbite. However, most of these samples were delivered by a Brazilian explorer"Cramer, T., Z. Amaya, J. Franco, A.Bonilla y A.Poveda.2011.*Caracterización de depósitos aluviales con manifestaciones de tantalio y niobio ("coltán") en las comunidades indígenas de Matraca y Caranacoa, Departamento del Guainía*. Bogotá: Contrato interadministrativo INGEOMINAS-Universidad Nacional de Colombia. Available in: http://goo.gl/UBJl2X

[41] Carrasco, E. y L. Peña. 2006. *Determinación de Zonas Optimas para Exploración en el Oriente Colombiano a través de Modelamiento Geoquímico*. Bogotá: INGEOMINAS.

[42] Colombian national and semi-state company, for exploration, transport and production of hydrocarbons.

[43] Carrasco, E. y L. Peña. 2006. *Determinación de Zonas Optimas para Exploración en el Oriente Colombiano a través de Modelamiento Geoquímico*. Bogotá: INGEOMINAS.

[44] Gómez, Ignacio. 2012. *Colombia's black-market coltan tied to drug traffickers, paramilitaries.* The Center for Public Integrity. Available in: http://www.publicintegrity.org/node/8284 .

[45] Ibíd.

In Bogotá, one kilo of coltan costs between USD $200 and USD $500 while one ton could cost between USD $40.000 and USD $60.000. According to ICIJ, "*guerrillas control the mine, paramilitaries control the paths to the Guaviare River and narco-trafficking gangs transport the mineral*". In fact, mine workers have claimed that they must pay taxes to the armed groups, between USD $2.000 and USD $2.500 per ton.

The Ministry of National Defense show that the FARC has reported that criminal bands (BACRIM) and drug trafficking organizations exploit the "blue gold": "*The Acacio Medina front of the FARC, run by Gener García Medina, alias John 40, is exploiting the ore*",[46] Juan Carlos Pinzón, Minister at that moment, claimed. Also, as the ICIJ reported in March 2012, "*Those armed groups have coerced the native Indians who live in the region to work the mines or bought their labor with free beer, food, and brand-name athletic shoes, (…) while production is still low (…), the threat is that as output grows, it could become a "conflict mineral" that could be a source of funding for the region's drug traffickers and well-armed paramilitaries in and around the Amazon region*".[47]

In fact, the Sinaloa cartel also took part in the black-market of coltan in the Colombian Amazon, Near Puinawai National Park: "*Members of the Cifuentes Villa family run an illicit coltan mining activity. In indictments filed in U.S. federal court, anti-drug authorities say fugitive members of the family supply cocaine to Joaquín Guzmán Loera (known as "El Chapo") and his drug cartel*"[48]. For U.S. officials, this illegal mining company is based on money-laundering, supporting the cocaine-smuggling enterprise.

Finally, it must be noted that in 2010, Alvaro Uribe, Colombian President at that moment, announced plans to auction off areas to permit coltan mining, but those plans were never completed. In March 2012, an official from the Mines and Energy Ministry stated that the government aimed to allow legal mining firms to bid for the rights to mine the ore and other "strategic minerals". However, in July 2014 the National Mining Cadastre had 750 requests for licenses of niobium, tantalum, vanadium and zirconium, mostly by individuals, meanwhile

[46]Caracol Radio (2013) *Sólo hay una licencia legal para explotar Coltán en Colombia: Mindefensa*. Available in: http://goo.gl/RBmlj5
[47]Hiar, Corbin *(*2012) *Colombia vows to clean up coltan mining.* The International consortium of Investigative Journalists, ICIJ. Available in: http://goo.gl/TUa9bI
[48] Gómez, Ignacio. 2012. *Colombia's black-market coltan tied to drug traffickers, paramilitaries.* The Center for Public Integrity. Available in: http://www.publicintegrity.org/node/8284

81 companies participated for mineral titles. Nevertheless, the National Government ordered the National Mining Agency to deny all the requests.[49]

Conclusions

This paper presented a socio-economic background of Colombia and a concise review of the armed groups that nowadays affect the territory like the guerrillas –FARC and ELN- and the paramilitary militias. Historically, Colombia natural resources and geographical location have attracted armed groups and illegal practices. Illegal gold mining increased during the first decade of the present century, when various criminal networks changed their traditional funding methods based only on drug trafficking (mainly cocaine) to illegal mining and consequent and related violent activities, such as extortion and homicide. The route of illegal mining begins in the *Bajo Cauca* towns of the Antioquia department, and then the illegal gold transported to Medellín, to be finally delivered to Panama, The United States and various European countries. Despite Police efforts to fight against gold traffic, social and environmental damages remain.

Regarding coltan, theoretical and practical knowledge about Nb (niobium), Ta (tantalum) is scarce in Colombia. "Coltan" is not a mineral but a term or an abbreviation that refers to minerals that have Ta and Nb in high concentration; the economically most valuable mineralization of Ta and Nb are *tantalite* and *columbite*. So, in order to refer appropriately to coltan, we must talk about *tantalum* and *niobium*.

The lack of research and misinformation is probably feeding a false boom of “coltan”. However, although there is not official evidence to sustain a real boom, a wave of illegal mining activities of columbite and tantalite has been triggered, producing social and environmental consequences. Those consequences have been aggravated by the participation of guerrillas, paramilitaries, and narco-trafficking networks that control mines and transport the minerals. Even if Colombia lacks the expected concentrations and amounts of these minerals, the negative social consequences (such as raising of criminal activities affecting indigenous and poor populations) are currently a fact, especially in Colombia's southeastern Amazon jungle where much of the illegal mining and trafficking

[49] Portafolio (2014) *Gobierno no dará títulos mineros para explotación de coltán.* Available in: http://goo.gl/VSc8Ol

takes place. This situation is also aggravated by the fact that there is no regulation for the exploitation of “coltan”. Besides, since 2010 the government announced plans to auction off areas for mining of coltan, but it has not fulfilled so far.