Conflict and Dependence in Mineral Mining: The Case of Venezuela

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I. Introduction.
Human conflict and environmental problems often precipitate one another, yet their relationship is complex and interdependent. When considering the causes of international conflict, many turn to blame political instability due to authoritarian rule and ethnic conflict. Although political unrest fuels conflict, this instability can be directly linked to resource extraction and environmental degradation in the country. The global economy and future development depend on resource extraction, especially rare minerals like coltan, which are essential for developing technological capacitors used in computers, planes, wind turbines, and even military missiles. Developing nations often rely on resource extraction of minerals like coltan to aid development. In contrast, developed states rely on these exports to improve and increase the competitiveness of their industries. Coltan, given its relevance to technology, is one of the most in-demand resources of the 21st century, and its reserves are currently worth trillions of dollars. There is a significant power struggle for control over the reserves and profit, causing widespread violence within nations, regions, and international communities. Coltan mining in Venezuela exemplifies this dilemma.

II. Literature Review.
The United States Securities and Exchange Commission defines 3TG, or conflict minerals, as “the metals tantalum (and niobium), tin, tungsten, and gold, which are the extracts of the minerals cassiterite, columbite-tantalite, and wolframite, respectively.”¹ In this paper, the sole focus will be on columbite-tantalite, commonly known as coltan or tantalum. For clarity, I will solely refer to the mineral as coltan. Coltan becomes metallic tantalum and niobium, two metals widely used in electronics when refined. Specifically, the minerals are used to create tantalum capacitors, which are used in most electronic devices, including smartphones, computers, airplanes, military goods, and more. The European Commission on Trade defines these minerals as “conflict minerals” because “in politically unstable areas, armed groups often use forced labor to mine minerals. They then sell those minerals to fund their activities, for example to buy weapons.”²

In many ways, Coltan mining is a culmination of the need for minerals and the problems they create. Coltan also uniquely defines much of the international and domestic conflict and threatens the stability of the entire renewables industry. Although the industry has existed since the 17th century, the recent practical increase has correlated to a significant increase in literature around the issue. Its expansion underscores the relevance of this area. Despite being a relatively modern matter, the depth and extent of the existing literature indicate how applicable the dilemma of coltan mining is to historical and contemporary examples of similar extraction discussed previously, such as coal.

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In 2000, demand for the coltan industry peaked, and it became an essential part of technological development. The mineral was used in new electronic devices such as mobile phones and video game consoles since it is crucial to making computer capacitors. When Sony introduced the PlayStation II, the market value of coltan skyrocketed, as there was a global demand and shortage of the mineral. Within a year, the price increased over 12x, skyrocketing from $30 to $400 per pound. Across Africa and Latin America, people migrated to mining regions in a phenomenon known as the “Coltan Fever”. However, this also drew the attention of rebel groups, militias, and other armed groups for its potential to fund their ongoing military plans.

Coltan reserves are limited and only found in certain parts of the world, notably Central Africa, Australia, and South America. The primary way coltan is extracted is through pit mining. Miners dig large wells into the ground and then sluice the sediment to extract the mineral ore. Given the relatively simplistic process and extremely high demand, the industry employs thousands of workers. Although in many extraction host countries like the DRC and Brazil, the wage is competitive at $10-20 per week, workers make an extremely small portion of the total profit, especially considering the risk associated with their work. The demand for coltan is growing because of the increase in demand for technology, including the use of green energy like solar panels. Therefore, it is improbable that the coltan industry will cease to operate, as eliminating coltan extraction would significantly limit society’s ability to move away from non-renewable resources like gas and oil.

III. Case Study: Venezuela.

Venezuela’s historical patterns of exploitation and conflict have directly influenced current mining practices. Venezuela faces an acute humanitarian emergency as millions of citizens do not have access to fundamental human rights such as healthcare, food, and clean drinking water. The crisis has led to over 7 million (20% of the population) Venezuelan refugees and migrants since 2014, the largest in history. The country is fighting to gain stability and international political power as it has experienced “democratic backsliding” (a return to an authoritarian state) and humanitarian emergencies. This crisis is largely rooted in its colonial legacy and tumultuous political transitions.

Although not a comprehensive history of the country, it is essential to recognize the influence of Spanish colonization of Venezuela for its rich natural stores of precious metals and minerals and military

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4 ibid.
6 ibid.
7 Totolo (n 3) supra.
dictatorships following independence in the 19th century. Venezuela experienced a period of democracy with the election of Romulo Bentancourt, the ‘Father of Venezuelan Democracy’, in 1958 with a strong oil-dependent economy. However, corruption grew rapidly, and in 1989, the current president, Carlos Andres Perez, implemented a series of free-market reforms designed to solve the economic crisis. As gas prices continued to skyrocket, the national military brutally ended civilian riots across the country. As Venezuela was plunged back into a state of social unrest and military crackdown, Hugo Chavez, a former military officer, began to rise to power.

Between 1990 and 1994, Venezuela encountered five recessions, creating deep social fissures, and increasing anger. Chávez nationalized industries such as oil, ended international partnerships, and reconfigured the electoral system to favour his candidacy. By 2010, high crime rates, food insecurity, and record-breaking inflation challenged his popularity and legitimacy. By 2014, South America began to face economic collapse, and Venezuela’s GDP faced an extreme decrease (sharper than that of the Great Depression). In 2023, Venezuela was experiencing an ongoing hyperinflation crisis, with inflation at over 200%.

Venezuela has significant coltan reserves with extremely high commercial value, commonly known as ‘blue gold’ due to its bluish color. In response to the aforementioned political and economic instability, in 2009 Chávez attempted to compensate for this financial downturn through mineral extraction. Chávez announced the “discovery” of coltan in Western Venezuela. Although coltan mines were already legally operating, Chávez marketed this discovery as a turning point for Venezuelan industry.

In 2018, Venezuela began legally exporting the mineral and started building the largest and first coltan concentration plant, set to produce 160 MT annually. The reserve is located in Bolivar and is jointly controlled by the Venezuelan government and state power consortium. Most of Venezuela’s mines are owned by the government or state firms, allowing the country to use the trillions of dollars in reserves for national development and improved stability.

As attention to the mineral and international pressures increases, so do smuggling and displacement. The mineral poses a security threat to the region’s stability and larger international alliances and trade

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13 ibid.
14 ibid.
15 ibid.
19 ibid.
21 ibid.
deals. Coltan’s impact is directly felt in the country as exhibited by the extreme state violence and fight to control the mining industry.

The Orinoco Mining Arc is a large territory along the Orinoco River Basil, just under the Orinoco Oil Belt, as seen in Figure 1. The Orinoco Oil Belt holds the largest petroleum deposits, while the Orinoco Mining Arc holds rich mineral deposits. The territory makes up over 12% of Venezuela and includes states such as the Amazonas and Delta Amacuro. The Venezuelan government estimates that the region holds “$100 billion in coltan reserves … as well as three billion carats in diamonds, and at least 300,000 metric tons of rare earth elements.” However, the region is also very rich in biodiversity, with five national parks. For example, Canaima National Park, a UNESCO World Heritage with unique mountain ranges and flora and fauna, is at risk of being used for mining.

Figure 1: Map of Venezuela’s Mineral Mines (Source: SOS Orinoco).

IV. Analysis.
The wealth of natural resources in Venezuela has traditionally funded ongoing wars and armed conflicts, as well as state development in the wake of destruction and violence. Armed groups such as official state forces and rebel groups have fought to control the coltan mines. The mines are highly profitable because of the valuable resources and cheap, easily extorted labor force. Additionally, the smuggling of minerals is rapidly growing as the smuggled minerals avoid fines, certifications, and taxes. Moreover, given the

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22 “Predatory Mining in Venezuela: The Orinoco Mining Arc, Enclave Economies and the National Mining.” World Rainforest Movement.
24 ibid.
widespread political corruption, bribery is often used to reduce regulation and policy enforcement of the mines. Therefore, the mining process often funds Venezuela’s ongoing internal and external conflicts. However, it also aggravates conflict by exacerbating ideological divides, displacing large groups, degrading the environment, causing health problems, violating human rights, and threatening national security. This then necessitates mining expansion to fund the growing conflict, creating a never-ending, unregulated cycle of conflict expansion.

From a human rights perspective, coltan damages miners’ and surrounding communities’ health, safety, and prosperity. While mining practices constantly evolve, miners primarily extract coltan using an unrefined and undeveloped process. However, developing more advanced processing plants introduces new issues, as they remain largely unregulated. Since the industry is expanding rapidly and holds potential for immediate financial gain, Venezuelan populations are easily exploited for cheap labor. As regulations become less clear, the already informal industry can abuse and exploit workers with few consequences. The lack of reinvestment from mining profits greatly hurts the protection of workers. Although the coltan mines are extremely profitable, smugglers and militias privately pocket most of the profits. Little money is used to develop national infrastructure and social services like hospitals and schools.

As seen with the migration crisis, civilians are severely suffering. For example, child labor is a cheap source of labor for the largely unregulated industry. The unregulated and informal opportunities in the extractive industry provide a pathway for mines to use vulnerable children as cheap labor. Moreover, children often work in especially hazardous conditions with washers and diggers and are directly exposed to toxic material and unsafe conditions since they are cheap and easily replaceable. Much of Venezuela’s coltan development is based on Brazilian mining practices where child labor is a significant issue, especially in Bolivar. The Brazilian government has attempted to improve working conditions and end child labor in the mines. However, similar to Venezuela, political instability and corruption make it challenging to enforce these policies.

Coltan extraction exacerbates ideological divides and social cleavages while worsening economic inequality and heightening resource competition. Given that TNCs and foreign companies own the majority of coltan mines, the financial gains from coltan mining are highly concentrated and largely inaccessible to the majority of the population. To build these mines, many groups, especially indigenous people and rural communities, are being displaced from their homes. The increased development of the Orinoco Mining Arc threatens to displace significant portions of the 1.6 million inhabitants of the region, or 5% of Venezuela’s population. This is problematic because it destroys ancestral lands, disrupts settlement structures, and drives people into Venezuela’s already highly concentrated urban areas.

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26 Rendon (n 18) supra.
further destroying indigenous practices and forcing assimilation. According to the Center for Strategic & International Studies (CSIS), the expansion of the mining industry has affected land in the Alto Orinoco-Casiquiare Biosphere Reserve, the protected home of the Yanomami people and other indigenous people. Indigenous groups that live in this region of Southern Venezuela have been heavily affected and deeply involved in the policy regarding mining. However, the Maduro regime failed to consult them before “implementing public policies to promote mining in the region.” These conditions have endangered “approximately 500,000 workers [who] are involved in illegal mining operations, many of them from local indigenous communities who have been coerced into working through threats of violence or due to economic necessity. These miners mostly are impoverished Venezuelans, and an estimated 45 percent are underage.” Despite indigenous resistance, they have faced violent repression and been forced to “flee their ancestral homes.”

Furthermore, the human displacement in Venezuela is also contributing to massive land degradation and disruption of ecosystems. Coltan mining destroys many natural ecosystems, wildlife habitats, and habitable land for humans. Locations for coltan mining are picked unsystematically, and often, miners devastate forested areas and national parks. Also, the chemicals involved in the coltan extraction and processing leach into the ground and water sources, polluting freshwater resources and harming animals and plants. Expanding coltan mines leads to increased flooding, degraded soil, plantation systems, draining groundwater reservoirs, and increased runoff—all of which further disrupt the water cycle. Between draining local water supplies and causing the natural production of less water in the area, water is less available and the quality has decreased significantly. Local water sources went from clear and widely safe to drink to a dark, murky mud color, filled with dirt and debris. Overall, the extraction of coltan damages the natural water cycle, forever changing an area’s landscape even after a mine has been closed.

Figure 2: Mines in the Orinoco Arc (Source: AirPano).

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29 Rendon (n 18) supra.
30 ibid.
31 ibid.
33 ibid.
34 ibid.
Although coltan mining has not been active for a long enough time to understand long-term health effects, the health of workers and local communities is already suffering. At the immediate local level, miners are often crushing and processing mineral ore, exposing them to damaging dust particles in the air which often leads to respiratory problems. Handling these minerals and processing chemicals can also expose individuals to large amounts of radiation, causing physical ailments such as rashes and burns. Workers are also exposed to radioactive materials such as radon, uranium, and thorium daily which is linked to causing cancer, especially lung cancer. There is also the risk of exposure to chemicals, including cadmium, which is known for affecting reproductive health and fertility as well as causing birth defects.

The mining also presents significant regional threats. Extraction and production of minerals are extremely fossil fuel intensive, and the techniques directly degrade soil, air quality, and water sources. Over time, the mining also leaches toxic metals into the water and soil, creating a buildup of toxins and killing plants, animals, and humans. Although unknown, the long-term environmental impacts are estimated to be devastating. For example, mercury has seeped into soil and water systems, which has already affected indigenous populations and exposed them to dangerous levels of the chemical element. In the Venezuelan Cauri river basin, a tributary to the Orinoco, “92% of indigenous women had elevated levels of mercury, which could damage the kidney and brain and impede fetal development”.

In Venezuela, mining groups present serious threats to national security. At the local level guerrilla forces and “mafia networks” present a significant threat to state stability. For example, Colombian guerrilla forces control the Parguaza region. While they illegally expand into protected areas such as Los Gallitos, these forces purchase Venezuelan coltan at a significantly lower rate than the international trade rate.

However, the Venezuelan military often ignores illegal activities. It protects these forces for financial participation in the schemes and has developed “institutional’ pacts with Colombian guerrilla groups” such as The Revolutionary Armed Forces of Colombia (FARC) and National Liberation Army (ELN).

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40 Rendon (n 18) supra.
42 ibid.
43 “Coltan: The Venezuelan Regime’s Smuggling of ‘Blue Gold.’” SOS Orinoco.
As coltan travels across countries, it causes tension between state governments and armed groups. Given the lack of clear borders in some mines and the widespread smuggling, “the transnational nature of organized crime or of illegal exploitation of natural resources is another clear example of how local realities can be affected by regional and global Dynamics”.

Venezuela’s coltan reserves are expansive. However, national governments, foreign developers, and militant groups are all fighting to access the same limited resources. Therefore, “International competition for scarce resources in general, and for coltan in particular, is a key factor in the lack of state stability and the continuation of war”.

Given the plethora of ethical and practical concerns over coltan mining, there have been legislative attempts to rectify the issues and implement sustainable practices. Notably, the U.S. imposed sanctions in the late 2010s on political elites to curb human rights abuses, corruption, and breakdown of democracy. The U.S. then increased sanctions during the 2019 Venezuelan presidential crisis to target political illegitimacy. However, these economic sanctions were targeted at industries, including mining, which has had devastating effects on Venezuelans. As reported by The Washington Office on Latin America, instead of strengthening democracy, these sanctions have largely strengthened President Maduro’s position and made citizens more reliant on the corrupt government.

Both legislative attempts to curb the abuse that comes with coltan mining have had unforeseen and devastating impacts on vulnerable communities. These “solutions” fail to target the root causes of the problems, such as lack of infrastructure and consumer demands.

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V. Conclusion.
As demonstrated through coltan mining in Venezuela, natural resource extraction, particularly of rare finite minerals, instigates and perpetuates conflict. This conflict also maintains cycles of dependence. Although coltan extraction is similar to other cases, such as diamonds or oil, it presents a unique and paradoxical challenge as it is necessary for technological development. Although we depend on resources like oil, there are alternatives. With coltan, we not only lack alternatives, but the options for other exploitative resources like wind and solar depend on coltan.

This dilemma presents a plethora of questions to be explored in the future. How can nations achieve development sustainably? Whose responsibility is it to ensure coltan is consumed ethically? Is it possible to balance good governance and autonomy? As companies like Meta and Apple claim they only use sustainable sourcing, which, as illuminated in this study, is not possible, what metrics hold them responsible? What are ways to remedy the violence and damage done by the conflict cycle in Venezuela and beyond?

As seen by this case study analysis and questions for the future, resource extraction is a multidimensional problem that will require specific solutions in tandem with a shift in social norms. Given the increasing necessity for technology as a tool to reduce global conflict, states must commit to transparent policy-making and consumption while working to establish global standards.