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Introduction

Conflict minerals “are those that are mined in conditions of armed conflict and human rights abuse” (Epstein and Yuthas 15). There are many minerals that fall within this category, but for the sake of this project the focus will be four: tin (derived from cassiterite), tungsten (derived from wolframite), tantalum (derived from coltan), and gold (Epstein and Yuthas 15). These conflict minerals are tied not only to the above mentioned problems but also to environmental issues and fatalities; in addition, the American public is intimately connected to conflict minerals by consuming products that contain these minerals. The objective of this project will be to look at the above mentioned issues and problems associated with conflict minerals as well as the ways which have been created to alleviate the problems associated with conflict minerals.

The Geography of Conflict Minerals

While these four minerals, known as the 3T’s and gold, are naturally occurring in many countries in the world, one country where all four can be found is the Democratic Republic of the Congo (DRC). The Eastern portion of Congo stretching from Bunia North to Kindu is known as the “coltan-belt” for its plethora of the mineral (Montague 112). This area is composed of the Maniema and North Kivu regions. In addition to coltan, these regions are also sources of cassiterite and wolframite. Figure 1, below, shows where these regions are within the context of the DRC, as well as within the continent of Africa. In addition, South Kivu, the Congolese region west of the Congo-Rwanda border (in figure 1, the green area to the right of Maniema) is also a source area for conflict minerals.

Figure 1



Source: "Congo's Conflict Minerals: Clean Them Up." Map. *The Economist*. 2010. n. p. 19 Aug. 2010. Web. 22 Nov. 2012.

In addition to Eastern Congo, its neighboring nations are also sources of these minerals, but not to the extent of the DRC. Africa, though not the world's top supplier, has 4/5 of the world's tantalum reserves, and Congo's Eastern region alone contains 80% of Africa's tantalum (Montague 105). Due to the essential and rare nature of tantalum, an area with the majority of the world's reserves will field significant consequences of their resource abundance. Unfortunately for Congo, these have manifested in primarily negative ways.

Environmental Impact

One negative consequence of the mining of these conflict minerals in the DRC is the negative environmental impact. This impact includes but is not limited to deforestation, land degradation, contamination of water, and pollution (Chupezzi, Ingram, and Schure 21). Deforestation results from the removal of trees from the surface of mining areas (Nest 48). In addition, deforestation results from the cutting of trees for firewood (Nest 48).

In Eastern Congo deforestation is legally unregulated by the government, and therefore there is nothing in place to prevent it from occurring (Nest 49). The same is true of the lack of government regulations regarding land degradation in Eastern Congo. Land degradation results

from, among other things, the undercutting of vegetation at the surface of mining areas that leads to soil erosion (Nest 48).

Mining requires large amounts of water, so mines are typically located near water sources (Chupezi, Ingram, and Schure 21). Water is required to separate the minerals desired, such as coltan, from other non-desirable minerals extracted in the mining process (Nest 49). The use of large amounts of water in the mining process drains the local supply and causes the surface water to evaporate more quickly (Chupazi, Ingram, and Schure 21). Through its use of resources, such as water, mining depletes the environment in which it exists of essential elements.

Mining these minerals depletes and distorts many resources in the environment, but it also adds detrimental entities to the environment through pollution. One way in which mines pollute is through the use of mercury (Chupazi, Ingram, and Schure 21). Mercury can have devastating effects on human and species populations and thus affect entire ecosystems (Chupazi, Ingram, and Schure 21). In addition to mercury, silt and other residue from the mining process also ends up in the environment (Nest 49). The pollutants caused by mining these minerals not only contaminate the soil and lessen its viability to produce crops, but the presence of these pollutants also result in undrinkable water, which then becomes a conduit of diseases and a breeding ground for mosquitoes (which carry malaria) (Chupazi, Ingram, and Schure 21; Donohoe 176).

Another type of pollution that results from mining these minerals is air pollution. Gold smelting for example, “releases 142 tons of sulfur dioxide annually (13 percent of the world's total output)” as well as other air pollutants (Donohoe 176). The result of these pollutants is not only the degradation of the environment through acid rain and other environmental effects of air

pollution, but the human population also faces asthma, skin diseases, and lead poisoning from gold mining (Donohoe 176).

Human Rights Violations

In addition to degrading and exploiting natural resources, the mining of conflict minerals in the DRC has also led to and fueled the degradation and exploitation of human beings. One of the main means the rebel groups funded by conflict minerals employ to exert power over populations is the systematic rape of women and children (Zongwe 38). Rape is used as a psychological as well as a physical tool to cause populations to submit through force, intimidation, and the exertion of sexual dominance. Internationally, Congo has been dubbed the “rape capital of the world” by Margot Wallstrom, the U. N. Special Representative of the Secretary-General on Sexual Violence in Conflict, showing how prevalent the abuse is in the nation (Zongwe 40).

In addition to rape, these rebel groups also employ human rights violations such as torture, the use of children as laborers, and forced evictions (Donhoe 177; Epstein and Yuthas 15). The poor conditions with little pay (miners make between \$.25 and \$1.00 daily) in which workers labor adds to the list of Congolese workers grievances (French 487). Mining is also a very dangerous industry, and “many have died from collapsing tunnels in addition to suffocation due to inadequate breathing space” (French 487). While mining is a lethal trade for many, it is nothing in comparison to the war that is being raged in the region.

The death toll due to the war in Eastern Congo has reached exorbitant amounts. Since the mid-1990s, “roughly 3000 [deaths], [have] occurred every week in the Kivus, week in and week out, month after month, from year-to-year, more than 5 million to date by conservative estimates” (Ayers 181). As Ayers points out, in comparison, that is equal to the devastation of

one September 11th 2001 every week (181). This incredible loss of life and devastation is truly gut-wrenching and the motivation behind it all is even more repulsive.

Armed Conflict

The armed conflict that has occurred and is continuing to occur in the DRC is incredibly complex. “At one stage in the war, there were more than ten interrelated conflicts simultaneously taking place in the” DRC (Alao 115). The variety of actors engaged in this conflict emerged from various nations and came from unique situations (French 484). Some of the fractions involved in the war are not controlled from within the DRC, but from neighboring nations such as Rwanda and Uganda (Alao 129-130). These neighboring nations became involved in the DRC for a variety of political and primarily economic reasons. Rwanda became involved, when the *Interhamwe* (the rebel group responsible for the 1994 genocide) withdrew to the DRC (Alao 130). Uganda became involved to maintain national stability and demobilize rebel groups (namely the *Interhamwe*) (Alao 130).

While the war didn't start because of conflict minerals, they play a prominent role in its continuation. In fact, conflict minerals (and the resulting economic gains) were the main factor that contributed to both Uganda and Rwanda becoming involved in the dispute in the DRC. Simply from the mining of coltan in Congo “between late 1999 and late 2000 the Rwandan army alone reaped revenues of at least \$20 million a month” (Montague 112). The enormous wealth gained by Rwanda in the mining and trading of conflict minerals has also been enjoyed by Uganda, who exported more than 70 tons of coltan in 1999 (French 488). The revenues from this mining are then used to finance the war, resulting in their classification as “conflict minerals” (Montague 112).

The use of these conflict minerals by neighboring nations, such as Uganda, has negative impacts on their national economies. The revenues gained from this illegal trade contribute to the GDPs (gross domestic product) for these nations. In the 1990s, partially as a result of its participation in the mining and trade of conflict minerals, Uganda had one of the top two highest GDP growth rates on the African continent (Montague 107). While the GDP is typically used as an index to show the development and resources within a nation, in the case of Uganda, those aspects are not accurately reflected because a large portion of their GDP came from illegal sources and went back into funding the war in Congo.

Industries That Use Conflict Minerals

With such high revenues being generated from the mining of these minerals, they must be used in either lucrative industries or they must be required in abundance. In reality, they are both. The 3T's and gold "are found in cell phones, computers, and numerous other products...and they are part of the supply chain of many companies" (Epstein and Yuthas 13). Figure 2 shows the various industries that employ these minerals as well as their common uses. In addition, figure 2 also shows the percentage of the world supply that comes from the DRC.

As figure 2 shows, there are a variety of industries that utilize conflict minerals, including the automotive, construction, lighting, and aerospace industries to name a few. While conflict minerals are not isolated to one industry, the industry that uses all four minerals is the electronics industry. The 3T's and gold are key components that cell phones, laptops, and other electronics could not function without (Akl). Each mineral serves a unique purpose in the proper functioning of electronics (Akl).

Figure 2

Metal	Industries Using the Metal	Common Applications	Commercial Ores*	% World-Supply from DRC
Tin	<ul style="list-style-type: none"> ■ Electronics ■ Automotive ■ Industrial equipment ■ Construction 	<ul style="list-style-type: none"> ■ Solders for joining pipes and circuits ■ Tin plating of steel ■ Alloys (bronze, brass, pewter) 	Cassiterite	5%
Tantalum	<ul style="list-style-type: none"> ■ Electronics ■ Medical equipment ■ Industrial tools and equipment ■ Aerospace 	<ul style="list-style-type: none"> ■ Capacitors (in most electronics), ■ Carbide tools ■ Jet engine components 	Coltan (columbite-tantalite)	15-20%
Tungsten	<ul style="list-style-type: none"> ■ Electronics ■ Lighting ■ Industrial machinery 	<ul style="list-style-type: none"> ■ Metal wires, electrodes, electrical contacts ■ Heating, and welding applications 	Wolframite, Scheelite, Ferberite, hübnerite	0.60%
Gold	<ul style="list-style-type: none"> ■ Jewelry ■ Electronics ■ Aerospace 	<ul style="list-style-type: none"> ■ Jewelry ■ Electric plating and IC wiring 	Various free and combined forms	0.5-2%

Source: "SEC Approves Detailed Disclosure on 'Conflict Minerals'" Chart. *Forbes.com*. Forbes, 22 Aug. 2012. Web. 22 Nov. 2012.

In addition to the information provided in figure 2, another piece of quantitative data that is significant in regards to conflict minerals is the revenue generated from these minerals by arms groups. In 2008, gold mining in the DRC produced \$50 million in profits for armed forces (Epstein and Yuthas 15). In the same year, coltan (tantalum) production was at the same percentage (15-20%) as seen in figure 2 and grossed \$12 million in profits for armed groups (Epstein and Yuthas 15). In addition, tin and tungsten generated \$115 and \$7.4 million respectively to armed groups in Eastern Congo in 2008 alone (Epstein and Yuthas 15). When looking at the percentages in figure 2 of world supply, it may not seem like these minerals are that significant. However, when they are translated into dollar figures, the significance becomes apparent. The amount of devastation that a rebel group can do to the environment and to populations of people given \$7.4, \$12, \$50, or \$115 million is incredibly significant.

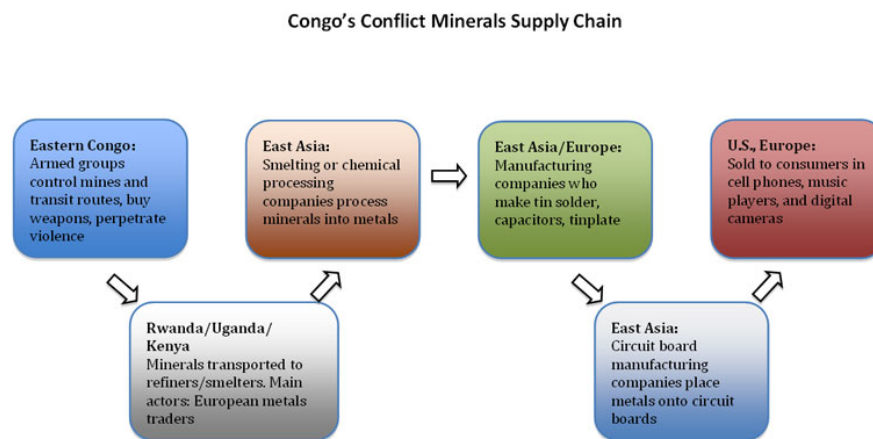
Global Interaction and Linkages

In the ever more globalized world in which we live, where economies, politics, and cultures are in constant contact with one another, the activities going on in one part of the world have ramifications around the globe. This international dynamic is essential to the trade and sale of conflict minerals. Once armed groups sell these minerals and reap the subsequent high

financial rewards, these minerals do not stay within the national borders of the DRC, but travel all over the world.

When these minerals are transported within the DRC, they are taxed by the arms groups and taken to trade houses in the major cities of Bukavu and Goma (Epstein and Yuthas 15). In these trade houses, international companies purchase these minerals and export them to countries such as Belgium or Malaysia (Epstein and Yuthas 16). Once the minerals are exported out of the African continent, they are mixed with minerals found in other nations and refined (Epstein and Yuthas 16). These minerals are then used as components within the various industries previously mentioned. The journey that conflict minerals take from the DRC until they become the final product in the United States and Europe is expressed in figure 3 below.

Figure 3



Source: Skibola, Nicole. "The Congo Goes Viral – A Call for the Electronics Industry to Take a Leadership Role in Conflict Minerals." Chart. *Rightrespect.org*. Right Respect, 1 July 2010. Web. 22 Nov. 2012.

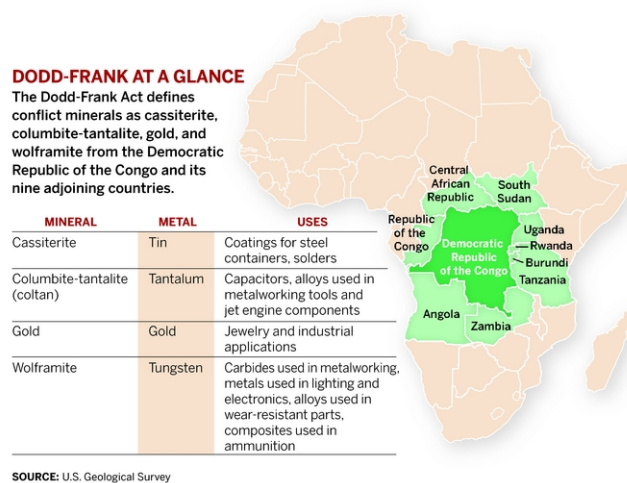
Figure 3 shows not only the various stages conflict minerals go through while they're being processed and refined into the final product, but it also shows all of the nations and regions of the world involved in the trade, transport, and manufacturing of conflict minerals. One country that is not involved in the mining or manufacturing conflict minerals, but is involving in consuming these minerals is America. The United States is entirely reliant upon international

supplies of tantalum to meet its market's demand (Montague 114). This results in the United States not only importing conflict minerals through electronics and other finished products (as in the supply chain in figure 3), but also in the United States directly importing minerals such as tantalum from the DRC, Rwanda, and Burundi (Montague 114). The linkages associated with conflict minerals (brought to light in the supply chain in figure 3) show that the problem of the 3T's and gold is not within the DRC alone, but that East Asia, Europe, and the United States also have a vested interest and contribute to the trade and thus share the burden of conflict minerals with the DRC.

Exogenous Efforts to Combat Conflict Minerals

One means of the international community sharing the burden of the problem of conflict minerals with DRC is through the Dodd-Frank Wall Street Reform and Consumer Protection Act. The Dodd-Frank Act, which came into effect in 2010, has within in a provision that pertains to conflict minerals (Epstein and Yuthas 16). This provision mandates that the United States Secretaries of Exchange (SEC) must construct regulations regarding these minerals (Epstein and Yuthas 16). The SEC has complied with the Dodd-Frank Act by requiring companies to acknowledge if the components that they use in their products come from the DRC or an adjoining country. The countries that are under the jurisdiction of the Dodd-Frank Act, well as a summary of the act's definition of a conflict mineral are seen in figure 4 below.

Figure 4



Source: Arnaud, Celia H. "Fingerprinting Conflict Minerals." Map. *Cen.acs.org*. Chemical & Engineering News, 30 Apr. 2012. Web. 22 Nov. 2012.

As figure 4 illustrates, the legislation created by the SEC, while concentrated on conflict minerals from the DRC also makes accommodation for those exported, traded, or smuggled out by neighboring nations for export. The SEC's rules put the responsibility upon the companies to ensure their products don't contain conflict minerals as opposed to the responsibility falling upon the manufacturers (Epstein and Yuthas 16). The introduction of this legislation will require nearly 6,000 companies to analyze their supply chains to ensure their minerals are coming from legitimate sources (Epstein and Yuthas 16).

In addition to legal international efforts, there are various international non-governmental organizations (INGOs) who were actively involved in combating the problem of conflict minerals in the DRC. These INGOs include the Enough Project, Global Witness, and Raise Hope for Congo (Epstein and Yuthas 16). Other international organizations such as, the United Nations are also actively involved in solving the problem of conflict minerals in the DRC (Epstein and Yuthas 16).

In order to combat the use of conflict minerals, the United Nations has reinstated an arms embargo in the DRC and has created guidelines for those involved with products containing

these minerals (Epstein and Yuthas 16). The guidelines have jurisdiction over those who import the minerals, manufacturers, and those who consume the minerals (Epstein and Yuthas 16). The guidelines created by the U. N. have to do with investigating and checking supply chains, as well as fostering companies' leadership structure (Epstein and Yuthas 16).

Endogenous Efforts to Combat Conflict Minerals

In addition to international efforts to solve the problem of conflict minerals, there are also efforts within the DRC to combat the use of conflict minerals and their repercussions. One such group with significant international ties is Congo Global Action. While this organization works on an international level, and their appeal is global, they also operate on a local, grassroots level ("Contribute"). The importance of efforts to combat this problem at the local level cannot be overstated. International pressure and intervention are helpful in raising awareness and working to end the use of conflict minerals, but if not followed by a local initiative, international efforts will prove ineffective and fall short of achieving their goal.

Due to the lucrative nature of these minerals, creating a conflict-free supply chain for electronic producers such as Apple will undoubtedly take a collaboration of international intervention and local initiatives. The resources and power that a company like Apple has when compared to a grass roots NGO like Congo Global Action is no contest. Apple wins hands down. However, the problem of conflict minerals transcends the issue of supply chains and encompasses a variety of other problems (including human rights abuses, environmental degradation, etc.) that NGOs such as Congo Global Action are essential for solving. As a result of all of these efforts, and the increase in international awareness of conflict minerals they generate, electronics companies like Apple Inc. and Motorola are actively engaging in efforts to

achieve “conflict-free” status in order to make their products more marketable to a more conscientious public (York).

Conclusion

Conflict minerals are complex entities that involve individuals from all walks of life, from the miners who risk their lives excavating these minerals, to the armed forces who use them to fund their wars, to the women and children who are sexually abused as a means of pacification, all the way to American consumers. These minerals are a prime example of what is known as “Africa’s resource curse: The wealth is unearthed by the poor, controlled by the strong, then sold to the world largely oblivious of its origins” (Polgreen). However, with the help of international legislation and INGOs, like the Enough Project, light is being shed into the dark industry of conflict minerals in the DRC, the result is an increase in public consciousness, and companies are seeking means of establishing conflict-free supply chains.

There is still a long way to go and the war, human rights abuses, and environmental degradation that has occurred as a result of the mining and trade of conflict minerals is continuing and will for some time, but progress is being made. The progress that has been made through legislation and the efforts of countless individuals provides hope for the DRC. Hope that with the right forethought, opportunities, and ingenuity introduced into Eastern Congo, the 3T’s and gold will be transformed from being a curse into a blessing and conflict minerals will one day be a thing of the past.

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