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Assessment of the Effect of Mining Activities on Water Resources and the Urban Areas of Developing Nations

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ABSTRACT

This review examines the impact of mining in the urban environment of developing countries. The key objectives were to; investigate the impacts of mining in the urban environments of developing countries, and to examine case studies of mining impact in particular locations of developing countries. The study concluded that mining in urban areas of developing countries is a challenging exercise and has the potential to inconvenience many people. It requires careful planning and management. It is feasible for mining and urban development to co-exist. However, this can only be achievable by minimizing environmental damage through improving environmental planning, management, and rehabilitation throughout the life of the mining operation.

Keywords: *Mining; Urban Environment; Developing Countries.*

1. Introduction

Most developing countries rely on their mining sectors to boost economic growth. This is especially true where the resources gained from mining are used to create employment and supply vital capital needed for water supply schemes and other infrastructural development (Steve, 2008). Various cities and regions in developing countries have built their wealth and industrial development at least in part to mining. In Africa, colonial and post-colonial investment strategies informed by the basic criteria of investing in regions with exploitable and exportable resources, and subsequent provision of basic infrastructure attracted the population and development into towns (Konadu and Adamu, 2001).

For example, (Dickson, 1971) noted, that the introduction of modern mining technology in the past had been responsible for the rapid development of many settlements into towns in southern Ghana especially in the Ashanti and Western Regions, and this continues to be the case today. The presence of exploitable mineral deposits closer to a settlement provides a strong influence on the settlement's growth and the rate at which these towns grow depended on the scale of the mining operations. Dickson also noted situations where some towns such as Nsuta in the Western Region of Ghana may not even have existed as recognizable villages but were essentially the sole creation of mining activities (Dickson, 1971).

The (GSS, 2002) in their report stated that besides the national capital city region (Accra-Tema) and Kumasi, whose population has grown quite significantly for the last two decades from 60,617 in 1984 to 115,564 in 2000, all the other notable mining centers include Obuasi, Tarkwa, Prestea, Nsuta, Bibiani, and Dunkwa can be classified as urban areas. Therefore, the location of settlements closer to mineral deposits provides opportunities for the growth of rural settlements as towns.

Other historical examples include Monterrey in Mexico which emerged from the mining boom of the 19th century as a processor of iron ore and steel (World Bank, 2002), Colombia's Antioquia province, with its epicenter Medellin, and Sao Paolo Brazil. Others include Zambia's copper belt, Chile's Antofagasta region, the southwestern area of Ghana, and China's Shanxi province. Petroleum fuels, metallic ores, limestones clay, sand, gravel, and crushed stores are some of the principal minerals mined. However, there is widespread concern for the effects of these mining activities on the environment (Adekoya, 1995).

These mining activities have left a legacy of hazards to the environment such as wastes, unstable ground, surface and groundwater contamination, alteration of habitat, and chemical alteration of soil (Colby, 1990). According to (ADB, 1999) the last four decades have witnessed an increase in urban population in developing countries. This hyper urbanization trends and the concentration of urban population in cities of developing countries bring not only the problem of resource limitation to the fore, but add to traditional environmental risks such as high poverty incidence, malnutrition, and other water sanitation-related diseases. This situation is also exacerbated by modern environmental risks such as mining and quarrying, exposure to hazardous and toxic substances, industrial waste pollution, air pollution, noise, and lack of urban space.

According to (Sengendo, 1997) rapid urbanization is creating environmental problems in the developing world. These urban areas are the main catalyst of economic advancement thus failure of the government to manage the impact of urban growth is threatening health, environmental quality, and urban productivity. As the population grows and processes of urbanization continue, new demand for minerals, urban space, and environmental quality becomes increasingly important (James, 2002). Unfortunately, these demands as related to the mining companies and their urban dwellers are not always mutually compactable (Colby, 1990). The mineral producer is dependent upon the mineral-rich land, cheap labor, proximity to market, and primarily established or expanding urban regions. While the growing urban areas need minerals such as coal or gas for fuel, but not the subsidence of abandoned and collapsing mines, pollution, noise, water contamination, etc. They need limestone for cement but not the dust and noise released during blasting; they need sand and gravel for construction but not the stream sedimentation created during washing operation (Anzorena, 1998).

One of the key emphases in the 1992 Rio Declaration is "human beings are at the center of concern for sustainable development. They are entitled to a healthy and productive life in harmony with nature". Efforts are been made along this line by some developing countries, but achieving this entitlement remains a serious challenge (Ezeonu, 2011). If proper precautions are not taken in terms of standard management procedures as seen in some developed nations, many mining activities can result in permanent damage to the environment and can also give rise to associated increases in cost for environmental compliance, and or liability for the future generation.

Mining activity according to (Sahu and Dash, 2011) exerts a long-lasting impact on the landscape, eco-system, and socio-economic considerations. It is noteworthy to mention that the actual landmass available to mankind is just 30% of the total global land area. In India for example land area is about 2-3% of the global population, whereas it supports more than 16% of the global population. This important statistic reveals that the poor per capita land holding stands at 0.32 hectares, which calls for due attention to restoration/reclamation of the land after mining in order to utilize the land for a useful purpose.

Objectives of the study

This study specifically seeks to;

1. Investigate the impacts of mining in the urban environments of developing countries.

2. Examine case studies of mining impact in particular locations of developing countries.

2. Literature Review

Conceptual Review

An Overview of Mining and Mining Processes

The term mining covers all aspects of metal production, including mine development, extraction, smelting, re-mining, and ward management (Warhurst, 1999). It is the extraction of valuable minerals or other geological materials from the earth from an ore body, lode, vein, seam, or reef which forms the mineralized package of economic interest to the miner (Steve Pearce 1999). To gain access to the mineralized package within an area, it is often necessary to mine through or remove waste materials that are not of immediate interest to the miner. The total movement of ore and waste constitutes the mining process. So mining is a process through which man wins minerals from the earth and turns them into valuable goods for his use (Dung gwom, 2007). Ores, by mining, include metals, coal, oil shale, gemstones, limestone and dimension stone, rock salt and potash, gravel, and clay (Remy, Garnett and Williams 2000).

Processes of Mining

The process of mining involves:

a. Exploration

b. Exploitation (extraction)

c. Processing

d. Re-mining

e. Waste management

f. Mine closure /Post mining activities (Dung gwom, 2007).

In other words, the mining process involves prospecting for ore bodies, analysis of the profit potential of a proposed mine, extraction of the desired materials, and final reclamation of the land after the mine is closed (Hartman, Howard 1992). The nature of these mining processes creates a potential negative impact on the environment both during the mining operations and for years after the mine is closed (Mallo, 2012).

Mining Techniques

Mining Techniques are divided into two, surface mining and sub-surface mining.

Surface Mining

Typical surface mining methods include strip mining and open-pit mining as well as dredge, placer, and hydraulic mining in riverbeds, terraces, and beaches. These activities always disrupt the surface and this, in turn, affects soils, surface water and near-surface groundwater, fauna, flora, and all alternative types of land use (Fuggle and Rabie,1994). Open-pit mining is done by removing surface vegetation dirt and if necessary, layers of bedrock to reach buried ore deposits. It involves the removal of natively vegetated areas and is, therefore, among the most environmentally destructive type of mining, especially within tropical forests. The open cast mining method was generally used in predominantly flat plains of the Jos plateau, as tin and columbite were concentrated in old stream beds (alluvial), having been washed down from younger granite outcropping units (Gyang and Ashano 2009).

Surface mining methods are most economical in situations where mineral deposits occur close to the surface (such as coal, salts and other evaporate deposits or road quarry material) or form part of surface deposits (such as gold and diamonds and heavy mineral sands).

Also, because open-pit mining is sometimes employed for ore deposits at a substantial depth underground, it usually involves the creation of a pit that extends below the water table (George, Ephraim, and Onyeka, 2010) in this case, groundwater must be pumped out of the pit to allow mining take place. A pit lake usually forms at some point in time after mining stops and groundwater pumps are turned off. The use of heavy machinery, usually bulldozers and dump trucks is the most common means of removing these overburdens. Generally, most mining projects in developing countries involve open-pit mining.

Figure 1: Yanacocha open-pit gold mine in northern Peru, the largest and probably the most profitable in the world

Sub-Surface Mining

A minimal amount of overburden is removed to gain access to the ore deposit. Access to this ore deposit is gained by tunnels or shafts. Shallow underground mining, up to about 50m below the surface, includes board (room) and pillar mining (often used in coal mines), where pillars of the mineral seam are left to support overlying material. For example, (Fuggle and Rabie, 1996) reported that in some of the older South African coal mines in the Witbank area, roof collapse has occurred after the mines were closed, allowing air to enter the old workings and promoting spontaneous combustion in the residual coal. Some of the abandoned workings in this area have continued to burn for many years and have resulted in unplanned surface collapse as well as ground and surface water contamination through acidification and salinization of local aquifers and streams. Although underground mining is less environmentally destructive, it is often costlier and entails greater safety risks than strip mining and open-pit mining. Most large-scale mining projects in developing countries involve open-pit mining.

Figure 2: Underground miners (WHO 2000)

Ore Extraction

After removal of overburden, extraction of the mineral ore begins using specialized heavy equipment and machinery, such as loaders, haulers, and dump trucks, which transport the ore to processing facilities using haul roads. This activity creates a unique set of environmental impacts such as the emission of fugitive dust and air pollution.

Figure 3: Removal of overburden

Beneficiation

This is a process of grinding or milling of ore, and separating the relatively small quantities of metal from non-metallic materials of ore (Green peace 2010). The beneficiation process generates high-volume waste called tailing, the residue of an ore that remains after it has been milled and the desired metals have been extracted e.g., cyanide as in gold or suphuric acid as in copper. Most of these tailings are disposed in water courses and in dug pits thus, the key long-term goal of these tailings (toxic waste) is the disposal and management, to prevent them from mobilization and release into the environment.

Figure 4: Grinding and crushing operations in gold processing result in unsafe exposure

Impact of Mining on the Urban Environment

The mining of minerals is an environmentally unfriendly activity, which has and will continue to attract attention from the standpoint of their environmental impacts and mitigation (Saxena, 2000). The magnitude and significance of the impact on the environment due to mining varies from mineral to mineral and also on the potential of the surrounding environment to absorb the negative effects of mining, geophysical disposition of the mineral deposits, and size of mining operations (Dung Gwom, 2007). All mining activities create considerable wastes/overburdens and tailings, including acid runoff and chemical by-products of refining. These problems are frequently more pronounced in under-regulated developing countries where mining companies can be free to pollute the environment with impunity (Zocche, 2010). The various impacts of mining activities in the environment are reviewed below.

Alteration of Habitat and Landscape

Mining and land use drilling significantly alters landscapes and wildlife habitats. The process often disturbs thousands of acres of land surrounding extraction operations and beyond. Peripheral infrastructure also alters habitat, including roads, workers' residences, and industrial complexes. Open-pit mines and mountain top removal techniques remove all surface fauna and topsoil to reach metals and minerals below. The ecosystem is also affected by the physical perturbations of mining operations, as well as the chemical alterations in soil and water (Waugh 2000). Resulting in badly degraded landscapes, change in land use patterns as a result of dumping and other mining activities, and sometimes abandoned facilities that continue to leach pollution long after operations have ceased.

Figure 5: Decant of AMD from the abandoned Transvaal and Delagoa Bay Colliery close to Mpumalanga Town

Ecological Disturbance

This is an adverse effect of mineral extraction and processing activity, which may not be immediately felt. It is the disturbance of the ecosystem with adverse consequences on the flora and fauna community in general, for example, deforestation of an area be it artificial game forest or natural forest for mining development may cause the elimination of some plants and the exodus of some animals that feed on such plants or depend on them for cover similarly, the noise generated in the course of blasting, quarrying, and crushing can also frighten away part of the fauna in mining areas.

Waste Disposal

One of the biggest environmental threats posed by mining in urban areas of developing countries is waste disposal. Most minerals mined are characterized by high sulphide contents, pyrite, and marcasite. These wastes contain a broad arrangement of elements including metals such as copper, cobalt, mercury, arsenic, and zinc among others. The contact of these waste materials with air and water results in Acid Mine Drainage (AMD).

Impact on Water Regime

Mining and its associated activities have quantitative as well as qualitative impacts on the water regime in and around the environment. Polluted water sources mean that the plants and sediments within water bodies are contaminated. Organisms that feed off these elements, terrestrial animals and man that are higher up in the food chain may accumulate toxic levels in their tissues thereby giving rise to ill health. Accumulation of these elements may also destroy the aquatic habitat by encrusting stream beds and aquatic plants (Green peace, 2010).

Both open cast mining and underground mining technique have a fair share of impacts on the water regime. The impact of open cast mining on water regime could further be outlined as follows;

I. All acquirers, including the water-table acquirer, above the mineral deposit to be extracted are damaged because for exposing the mineral for extraction the overburdened rocks are removed.

II. Water in nearby water bodies gets polluted due to leaching from overburden dumps, discharge of pumped out mine water, and other activities in the vicinity of the water bodies. (Lindslay, 1975)

III. In the areas having pyrites and sulfides in the rock mass the mine water as well as the leachets may be acidic and their discharge in the surface water bodies may enhance heavy metal pollution potential.

As a result of underground mining, the overlying underground water bodies are disturbed and water from them finds its way to the underground workings from where it is pumped out. The disturbance to the underground water bodies reduces the availability of water not only in the mining area but also in the neighboring areas (Mallo, 2012). Mine ponds resulting from mining activities in the Jos plateau mining have resulted in several deaths, with about 106 recorded from the years 1980 – 1993 (Adiuku and Brown 1999).

Figure 6: Acid mine drainage in the West Rand South Africa

Impact on Soil

Mining requires deforestation and vegetation removal (Ned, Elkins, Lawrence, Parker, and Earl 1984). Soil compaction is one of the resultant effects of mining on the earth's surface. Compaction is often the result of bulldozers and other pieces of large machinery moving across the landscape. As the soil is compacted there are fewer pore spaces for oxygen and water to move through the soil profile, minimizing the potential for plant establishment (Hartman and Howard 1992). Water is unable to percolate down through the soil, it inevitably will move across the surface of the landscape changing the morphology of the land and increasing the possibility of contamination of nearby aquatic systems such as streams, lakes, ponds, etc. Mining operations also contaminate the soil with toxic heavy metals and acids. (Harrison, 2012). This acid lowers the PH of the soil, preventing minerals in the soil that are required by plants, such as calcium and magnesium. The hydrogen ions from the acid absorb the soil particles, preventing other nutrients required by plants to remain in the soil (Elkins, parker, and Aldon 1984). Mining causes soil Erosion, this occurs when a great deal of materials, such as rock or soil, is disturbed due to drilling or earth movement (Harrison, 2010).

Impact on Vegetation

Vegetation in form of natural forest or crop plantation is usually the first casualty to suffer total or partial destruction or degradation during mining of minerals in an area. (Mabo, 2007). The vegetation damage is more extensive at the time of mine development and mining operations and is more expensive when crop plantation is affected (Aigbedion and Iyayi, 2007). Recent environmental impact studies of limestone mining and cement industry in SagamuNigeria have revealed a declining kola nut output from plantations within a few kilometers radius of the cement factory (Aigbedion 2005, Adekoye, 2003). The dust from this industry gets deposited on the kola nut leaves and flowers as well as the soil supporting the plants. The overall effect of this is that the photosynthetic and fruiting ability of the kola nut production is reduced. In the Jos plateau, the large amount of vegetation was stripped due to the open cast mining, and particularly in the river areas, this has virtually changed the landscape of the Jos plateau city (Dung Gwon, 2007).

Land Degradation

The ratio of overburden excavation to the amount of mineral removed is called the stripping ratio (Sahu and Dash. 2011). For example, a stripping ratio of 4:1 means four tonnes of waste rock are removed to extract one ton of ore. The lower the ratio, the more productive the mine. The stripping ratio varies with the area under mining. For example, according to the data generated by the Indian Bureau of Mines, the average stripping ratio for limestone mines in India is 1:1.05, which is good, however, the generation of overburdens varies from mine to mine. It is as high as 1:363 tones per tonne of limestone in the case of Maohras cement.

Impact of Mining on Land Use

The land is one of the most important resources for the urban populace, as this is needed for all the activities. Mining activities, whether by underground or by open cast methods affect the land in various ways.

1. The land-use pattern of an urban environment undergoes changes due to the use of the land for mining, dumping, and other associated activities. e.g. past mining activities in former coat fields of the north of England, and the metal mining districts of Cornwall, remain a major influence on the physical & social, and scape of these areas (Bloodwort, Scott and McEvoy 2009).

2. There are also changes in land use due to construction and infrastructure development, changes in topography and drainage pattern due to subsidence, disturbances in the effective land use due to damage to the surface, sub-surface, and underground water bodies.

3. Another impact on land use is the development of mine fires resulting from the rock mass having carbonaceous shale's. When these fires become surface fires, they tend to damage the land over and adjacent to them due to subsidence and heat (Saxena, 2000).

4. In the coal mining areas, there are chances of a sudden collapse of underground workings causing a marked depression on the surface as observed in the Zawar coal mine area in India (Saxena, 2000).

5. Mining in the urban areas encourages urbanization, development of infrastructure, expansion of colonies, and urban structure thus, causing a change in land use.

Mining Impact on the Human Environment

Any deterioration in the physical, chemical, and biological quality of the environment affects human health and flora and fauna (Sahu and Dash 2011). Mining activities have negative impact on the health of both workers and the inhabitants living close to the mines (WHO, 2007). Chronic inhalation of coal dust has been linked to increased incidences of oxidative stress in mining towns (UN Global, 1996-2000). Other conditions that may result include lung damage, potentially toxic accumulation of metals in human body tissues; diseases like pneumoconiosis (black lung disease) bronchitis, emphysema, fibrosis, and cancer. Others include the generation of pro-inflammatory factors, leading to premature aging, pro-oxidant and antioxidant alterations that lead to cellular damage, cardiopulmonary disease, hypertension, skin lesions, and other lung and kidney diseases (Green peace, 2010).

Gold mining emits a toxic level of arsenic, fluorine, mercury, and selenium, which enter the local food chain via contamination of air and water supplies (Coetzee, Wade, and Winde 2006). Thus, a high concentration of various trace elements like copper, uranium, nickel, and arsenic are found in local water supplies in mine areas and this leads to serious health effects on the people. For example, in the mining city of Lauro in Brazil, studies show that respiratory diseases are responsible for an estimated 30% of medical procedures, and 4% were related to various forms of cancer (Gomes, Mend and Costa 2011). In another study in Ebonyi State Nigeria, workers of the Quarry Industry were found to have suffered from lung diseases especially silicosis, due to exposure to a high level of dust particles (Aloh, 2007). High incidences of metal-related cancer have been found among coal mine workers in China (WHO, 2007). On the other hand, noise arising from machinery movement and blasting causes deafening and is a big nuisance to people living in and around the mines.

The mass lead poisoning from mining activities reported in Zamfara State Nigeria (Abiodun, 2011) was an eye-opener to the world, a survey carried out by the US center for disease control and prevention (US CDC) revealed that at least 43 villages from the state were confirmed cases of lead poisoning (blood lead concentration > 10 ugldl). In at least seven of these villages some children needed chelating therapy (blood lead concentration > 45 ugldl). With the combined effects of removal from lead exposure and chelating and other supportive therapy, the mortality rate among exposed children in several remediate villages dropped from 43% in 2010 to 1% in 2011.

A large volume of dust from the cement factories and mining operations in the Nigerian limestone quarries are discharged daily into the air. When the air is laden with such dust, it causes health hazards for some people. For example, pollution studies around Sagamu and Ewekoro cement work in Ogun State Sout west Nigeria have shown that several people are suffering from eye pain, and asthmatic attacks due to the dust-laden air that prevails within a few kilometers radii of the factories (Aigbedion, 2005). In another research carried out on the impact of granites quarry on the health of workers and nearby residents in Abeokuta Nigeria it discovered that the health problems suffered by workers and residents are those associated with inhalation of dust in the air (OguntokeAboaba and Goadebo 2009). Gravel mining in East Gonja (Ghana) has led to abandoned pits serving as a source of breeding grounds for mosquitoes and the resultant spread of malaria. HIV/Aids are also potential problems in the area especially in Maukango town, where people from other areas of the Northern region and parts of the Southern region of Ghana go to settle on a temporal basis to do business (Jafaru, 2009).

Socio-Economic Impact

Mining and its associated activities have several social and cultural impacts on the communities and the surrounding area in which it operates. Some of these impacts include:

Displacement of people: In the course of mining it is required, among other things to clear the surface of all buildings and structures along with the vegetation in the area designated for mining purposes. Therefore, all people living in these areas get displaced, and most times are not resettled (UN, 1985**).**

Water Scarcity- Mining either by open cast or by underground methods damages the water regime and thus causes a reduction in the overall availability of water in and around the mining area (see impact on water regime).

Cost of living- The development and associated mining activities in urban areas, increases the level of economic activities manifolds. An increase in industrial and economic activities generates more money and increases the buying power of the people directly and indirectly (Zancan, 2002). This leads to an increase in the overall cost of living, which adversely affects the low-income earners, especially the ethnic people, who make up the unskilled lowly paid workforce of the industry (Aloh, 2007).

Health impacts- Like mentioned earlier, the health and wellbeing of the people living in and around the mining areas get affected due to the level of pollutants in the air and water, noise, and vibrations.

Economic Disparity and frustration- Industrial and economic activities in mining areas bring about economic disparity among the population living in such an environment. Wealth disparity results due to the lack of income in these single resource-dependent regions (Kwesi and Kwasi 2011). For example, the people employed in organized mining activities may be earning more than those employed otherwise. These sometimes lead to social tension, anger, and frustration among the people employed in the non-mining sector of the economy.

Closure of Mines- Closure of mines sites result in job loss especially in developing countries where a majority of the urban population depends directly or indirectly on the mining activities.

This in turn leads to the formation of ghost towns, immigration in search of new job opportunities, cultural disturbance social instability (Cedric, 2008). This was seen in SofonBirinGwari, A mining town that once thrived on gold mining between 1914 and 1938 but was abandoned due to the exodus of miners and prospectors to the plateau tin fields in the early forties. Incidentally, the miners are currently returning to the Gwari area as a result of a discovery of gold deposits in the place Adekoya, 2003).

Geologic Impacts- Mining operations normally upset the equilibrium in the geologic environment (Mallo, 2012) which may trigger off certain geologic impacts such as landslides, subsidence, flooding, erosion, and tremors together with their secondary effects.

The urban environment is always prone to this impact as a result of infrastructure, drainage channels, and information technology. Some cases of subsidence and instability associated with the draining of oil and gas from the subsurface reserving have been reported in the Niger Delta area of Nigeria (Adekoya, 2003). Subsidence has also occurred in the Iva valley southeast Nigeria as a result of coal mining (Kogbe and Obialo, 1976).

Radiation Impacts- Exposure to natural radiations emitted by some radioactive minerals is a major source of health hazards. The radiation intensity increases when the minerals are concentrated (Algbedion and Iyayi 2007). Research carried in Jos plateau Nigeria established that some minerals such as monazite, pyrochlore, and xenotime, which are obtained as a byproduct of tin mining in the Jos plateau, are radioactive (Adekoya, 2003). Because of lack of market, most of these minerals, which were in form of concentrate, are abandoned in many previous mining sites on the plateau.

Poverty Alleviation and Wealth Distribution

Developing countries often seek to exploit mineral resources as a way of providing much-needed revenue. Mineral wealth forms part of a nation's natural capital and the more minerals a nation possesses the richer it becomes (Davis and Tilton, 2003).

For example, a study of the economic contributions of mining in Canada found that in 2000-2001 Canadian taxpayers subsidized the industry by C$13,095 per job created (Winfield, 2002). Even when mineral development results in national economic growth, the benefits are not always equitably shared, and local communities closest to the source of mineral development can suffer the most.

Case Studies of Mining Impact in Some Developing Countries

The Grasberg Gold Mine (New Guinea)
The PT Freeport Indonesia, the subsidiary that operates the Grasberg copper and gold mine, has been accused of environmental abuse that simply would not be broken in developed countries, especially the dumping of 130,000 tons of waste rock (known as tailings) a day into local rivers as a means of disposal this action terribly affected the lives of the urban dwellers. Grasberg is situated in the Jayawijaya range of New Guinea (Steve pierce 2008).

Obuasi Gold Mine (Ghana)
According to a research carried in 2005 to assess the positive and negative impacts of mining around the Obuasi mine of Anglo Gold Ashante, the report is summarized as follows. The perception among the inhabitants in the Obuasi town is that they were receiving insufficient economic benefits from the mines, increased conflicts over land use, continued environmental damage, and degradation (Akabzaa, Yakubo, and Seyire 2009).

Sadiola and Morila Gold Mine (Mali)
In a related study of the socio-economic effect of Gold mining in the mining towns of Sadiola and Morila in Mali, (Eyolf, BrehimaSiri and Ingrid 2006) found out that great prize has been paid in terms of social tension, environmental degradation, corruption, and extreme conflicts in what, scholars have come to call the resources curse.

5. Conclusion

Mining in urban areas of developing countries is a challenging exercise and has the potential to inconvenience many people. It requires careful planning and management. It is feasible for mining and urban development to co-exist. However, this can only be achievable by minimizing environmental damage through improving environmental planning, management, and rehabilitation throughout the life of the mining operation.

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