

**Case Study on
Environmental and health impacts of illegal mining in Burgersfort in
Limpopo Province
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1. Abstract

Purpose: Illegal mining is a global problem of concern to both industrialised and developing countries. It's a growing media concern. This case study examines the environmental and health impacts of illegal mining in the Burgersfort region.

Methods: Information was obtained through personal interviews and observations.

Results: Most communities of Burgersfort are from poor backgrounds, and they are more than affected by illegal mining. Most of them don't approve what The illegal miners are doing this on their land, as they destroy their land for agricultural production, causing trauma to them as a result of injuries and fatalities and also causing respiratory complications to their health.

2. Introduction

Limpopo Province is rich in natural minerals such as platinum, iron ore, chromium, coal, copper, diamond, silicon, and phosphate. The region is the largest mineral exporter. The province has 41% of South Africa's platinum group metals (PGMs), 90% of South Africa's red-granite resources and about 50% of the country's coal reserves. Mining is a sector with the potential to contribute to the development of economies. (Young, 2019)

The location of Burgersfort is in the Spekboom River valley at the edge of the Bushveld complex in the Fetakgomo Tubatse Local Municipality, near the border of the two provinces, Limpopo and Mpumalanga. (Burgersfort, n.d.)

Illegal mining dominates the Burgersfort community, with environmental and health impacts surrounding communities. In addition, many illicit miners are mining on the open cast. In this case study, we examine illegal miners' ecological and health effects around the Burgersfort community in Limpopo. We will also focus on mitigation measures applied to these impacts. Finally, we will elaborate on these effects in the discussion.

3. Environmental Impacts Factors

3.1. Water Pollution

South Africa is a country with a shortage of water with an annual rainfall of 40%. It is one of the 30 driest countries worldwide. Water shortages results due to leaking pipes, illegal connections or waste. The lack of water causes water pollution. For example, if there is not enough water for sanitation, the water can become contaminated by introducing disease-causing pathogens. Furthermore, water shortage causes an imbalance in the ecosystem. as a result, Food chains are affected, and biodiversity is compromised. (communication, government, 2015).

While there is a water shortage around the country, this illegal mining worsens water usage by contaminating nearby water bodies by leaching chemicals out of the mine site. These chemicals leak back into the river, contaminating the water the community uses daily. Most communities rely more on rivers for water usage. This pollution does threaten their lives and the lives of livestock. In addition, these illegal miners violated water rights because they did not have water and air quality permits for their mining operations. They mine on the abandoned mining companies that are liquidated, and some mine in new mines.



Figure 1.1 Water Pollution in wonderfontienspruit resulting in mine water effluent from a nearby stream
(by Nkwonta and Ochieng, 2009).

3.2. Poor soil fertility

Healthy soil is vital for plant growth, human nutrition and water filtration, and it also supports a landscape that is more adaptable to the impacts of drought, flood or fire. In addition, it helps to regulate the Earth's climate and store more carbon. Finally, soil fertility is a critical factor that directly impacts crop yields (Nair, 2018).

In Burgersfort, illegal mining poses a threat to soil fertility. According to the community of Burgersfort, illegal mining has affected their farming activities incorrectly because illegal miners strip the topsoil, resulting in the loss of the litter layer, an essential site for nutrient storage and exchange. The causes of poor soil fertility results in inadequate production of agricultural products.



Figure 1.2. Poor Soil Fertility

3.3. Limited access to land for agricultural productivity

The land is one of the most critical assets that poor rural women and men have. It fulfils essential economic, social, and ecological function. 75% of the poor are rural, depending primarily on agricultural production for their livelihood. Access to land by the poor for agricultural productivity is essential for sustainable poverty reduction. The livelihoods of rural people with minimal access to land for agricultural production are vulnerable because they have difficulty obtaining food straight from the ground. Distribution of land rights matters, and the opportunities for the poor to access land directly benefit household food security, livelihoods and income, thereby increasing poverty reduction (Quan, 2006).

For the community of Burgersfort, their farmland is limited by illegal miners. They invaded their land to extract minerals illegally and left the community with no land for agricultural production. Due to illegal mining, the communities have lost access to grazing, and now, many households must buy food for their livestock in other areas. Also, because of this illegal mining, they lose the option of harvesting agricultural

production, negatively affecting their cheap living. Most households rely on subsistence agriculture but pity that they have lost lots of hectares due to this illegal mining. The communities now have limited land due to those illegal miners who mine everywhere on their land.



Figure 1.3. Limited access to land due to open-cast mine (source: <https://mobile.twitter.com/elsieramere>)

3.4. Deforestation

Deforestation converts forested areas to non-forest lands such as arable land, urban use logged areas or wasteland. It is caused by elements, such as direct causes, including the conversion of forested lands for agriculture and cattle grazing, urbanisation, mining and oil exploitation (Rome, 2007).

For example, Illegal miners in Burgersfort are clearing trees around the community to extract illegal minerals while the community suffers from deforestation. This deforestation presents many challenges for communities. For example, it causes soil erosion and flooding during heavy rainfall, and the high sunlight damages the topsoil, which leads to unsuitable agricultural production. In addition, the communities depend more on those trees for oxygen and wood for fuel as their significant energy source.



Figure 1.4. Deforestation.(Source: <https://www.conserve-energy-future.com/causes-effects-solutions-of-deforestation.php>)

4. Health Impacts Factors

4.1. Respiratory complications

Respiratory complications refer to respiratory failure due to pulmonary complications such as aspiration, fluid overload, pneumonia, and sputum retention. (Commission, 2018).

The miners in Burgersfort risk suffering from respiratory complications due to the extra fine particles they inhale into their lung tissue due to the drilling and blasting method they use to extract their minerals. These illegal miners are vulnerable to these complications because they are exposed to the air and the exhaust from diesel engines and don't have protective clothing like respirators. Additionally, communities have suffered from the consequences of respiratory complications due to understanding how illegal mining affects their health and the lack of protective clothing such as masks.



Figure 1.5. Respiratory complications(source: <https://rtmagazine.com/disorders-diseases/infectious-diseases/pneumonia/complication-rates-greater-among-patients-aspiration-pneumonia/>)

4.2. Injuries and Fatalities

The mining industry is a vital sector of the South African National economy. However, a significant factor frightening the sustainability of this industry is mining accidents, which frequently result in injuries or death. (J Bonsu, 2017).

According to the Mine Health and Safety Act NO.29 of 1996 and its Regulations, miners need Personal Protective Equipment to protect their entire body from any harm or injury in the mining environment. (Mine Health and Safety Council, 2018).

In Burgersfort, the injuries and fatalities of the illegal miners have become a very traumatic issue to the communities. The communities experience death and injuries from unlawful miners now and then due to the miners mining without protective clothing and equipment. The mine walls also collapse, trapping the miners inside.



Figure 1.6. Injuries and fatalities

4.3 Poisoning and organ damage

Section 22 of the Mining Health and Safety Act states that each employee must protect their health and safety, as well as the health and safety of others, and use and maintain all equipment provided for health and safety. (Resources, 2016).

Poisoning and organ damage are serious problems, especially for illegal miners. For example, Illegal miners at the Burgersfort mine do not have protective equipment, especially respirators, which cover the nose and mouth to prevent dust inhalation. As a result, they end up inhaling dust and toxic substance from the mineral they mine, which leads to a severe cough, shortness of breath, asthma and some chest tightness. Communities also suffer the consequences of poisoning and organ damage due to high dust exposure, especially in windy conditions and in their dryness and low vegetation cover.

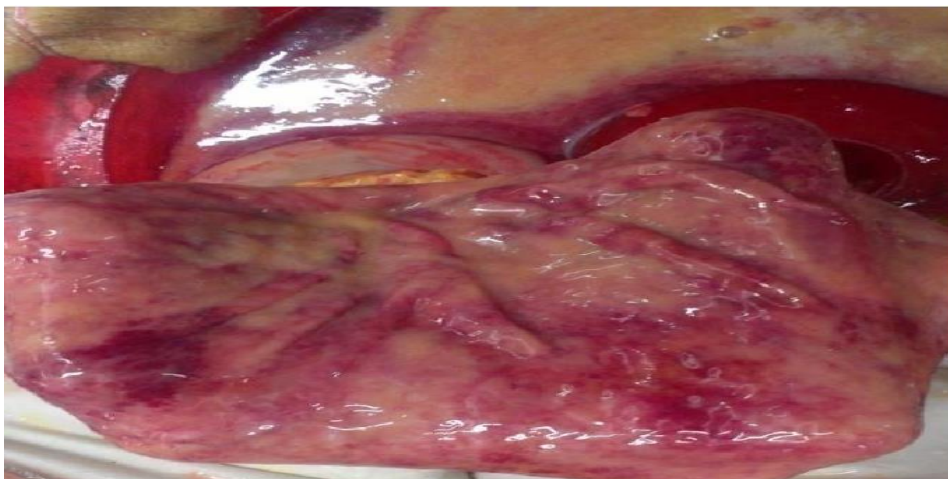


Figure 1.7 Poisoning and Organ damage(source: <https://www.semanticscholar.org/paper/Multiple-Organ-Damage-Due-to-Boric-Acid-Toxicity-Rani-Meena/5bee9bb6e5370810f80a1d3cc1d93a73a7754019>)



Figure 1.8 illegal open-cast mine (source: <https://www.pressreader.com/south-africa/sowetan/20170503/281621010237427>)

5. Recommendation

This study recommends that the Ministry of Mineral Resources and Energy has the authority to restore and rehabilitate areas degraded by mining by refilling open pit mines and restoring water bodies for sustainable environmental protection. With open casting predominant in the Burgersfort area, health issues such as respiratory complications, poisoning, organ damage, injury and death are expected. Using a variety of personal protective equipment will reduce these health problems. In addition, asthma, tuberculosis and many other diseases may occur due to the dust produced by drilling and blasting. However, periodic medical check-ups and treatment may minimise them.

6. Conclusion

This study specifically observed the environmental and health impacts caused by illegal mining activities around the communities of Burgersfort. The motive of this study was to detect the mining impacts on the environment on four elements, namely, water pollution, poor soil fertility, limited access to land for agricultural productivity and deforestation, and on three aspects of health, namely, respiratory complications, injuries and fatalities and poisoning and organ damage. The study result revealed that deforestation during mining preparation poses many community challenges. It causes soil erosion and flooding during heavy rains, and high sunlight damages the topsoil, which leads to unsuitable agricultural production. As observed in the area, illegal open-cast mining as observed in the study area has severely altered the landscape. It results in limited access to land for agricultural production. It has also suppressed and

prevented vegetation. Once removed from the mining operation, vegetation does not grow again, resulting in the permanent loss of valuable land for agricultural activities, leading to poverty for the current and future generations. Even though there are many environmental regulations and policies on paper, the illegal miners in Burgersfort are abusing the environment. As a result, the area has lost forest cover due to mining activities. In terms of health, mining has caused respiratory complications, injuries and fatalities, poisoning and organ damage due to the lack of protective clothing and equipment.

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