Restrepo, J Powder Metall Min 2023, 12:3

Journal of Powder Metallurgy & Mining

Mini Review Open Access

Coal Mining's Long-Term Viability. Is Germany A Good Example for Colombia After Mining?

Jaime Oscar Restrepo*

Department of Materials and Minerals, Universidad Nacional de Colombia, Colombia

Abstract

To assess the impact on the labor market of a coal phase-out, it is not sufficient to merely calculate the number of mining industry jobs. In this paper, we gauge the size of backhanded positions in Europe's biggest hard coal mining district, Upper Silesia and classify them as mining-related or mining-subordinate. Utilizing information from public tenders offered by five of the country's largest coal enterprises, as well as financial and employment data from official administrative repositories, we also provide a comprehensive overview of the structure and spatial distribution of mining-related companies. According to our observations, there is a significant agglomeration effect in the region, with 80% of all tender revenues going to businesses that are within 20 kilometers of the closest active hard coal mine. In addition, we discovered that, in the event of a decline in coal production, 41% of all jobs identified in Upper Silesia mining-dependent businesses face imminent closure. Finally, in order to overcome the drawbacks of the majority of top-down modeling approaches, we advocate for labor market mitigation policies that are specifically tailored to mining-dependent employees and recommend the widespread use of administrative data in just transition planning.

For quite a long time, coal mining assumed a vital part in Germany's financial history. It drove its industrialization as well as upheld its recuperation after The Second Great War. This industry in Germany entered a deep crisis in the middle of the 20th century primarily due to its high production costs. German hard coal mining was ultimately shut down as a result of this in 2018. Coal mining has also been a big part of Colombia's economy, especially since the big concessions started in the 1980s. The closure of this industry in Germany posed significant difficulties that have been resolved through ongoing regional structural transformation processes. In like manner, Germany's arrangement to deliberately get rid of coal from its energy network has additionally involved extraordinary moves that have expanded because of the ongoing energy emergency in Europe. On account of Colombia, worldwide patterns to diminish coal utilization will definitely influence its public funds in the medium term. Some projections of global energy and coal consumption, in addition to a comparison of scenarios from these two nations, demonstrate that strategies for the Colombian context can benefit from certain German experiences, particularly with regard to the processes of regional structural change.

Keywords: Mining; Post-mining; Coal; Energy

Introduction

Coal mining straightforwardly affects environments and human populaces. Sulfur dioxide, nitrogen oxides, heavy metals, and PAHs are among the pollutants whose concentrations rise when coal is burned. Particulate matter (PM) is also released into the environment during mining operations, where it can completely disperse into the atmosphere [1]. These fractions remain in the air for extended periods of time due to their micrometric and nanometric sizes, allowing nearby populations to inhale them. In light of their harmfulness, compound properties, and fixation in the air, coal particles can represent a gamble to human wellbeing. Because of the leaching of genotoxic compounds and changes in immune mechanisms when the particles are inhaled and deposited in the lung, they can cause diseases like bronchitis, asthma, emphysema, and cancer to develop in the parenchyma of the lung.

The fundamental molecular mechanism of metal-induced toxicity is oxidative stress. Reactive oxygen species (ROS) are the byproducts of many metals' redox reactions [2]. ROS overwhelmingly cause DNA base or sugar harm, prompting the development of single-abandoned breaks (SSBs) and they can likewise cause hereditary and chromosomal changes through twofold strand breaks (DSBs).

Using DNA-repair enzymes (DNA glycosylases) like DNA-formamidopyrimidine glycosylase (FPG) and Endonuclease the comet assay has been improved over the past few decades to detect additional lesions, particularly oxidized bases. This enzyme-modified comet assay has traditionally been used to detect oxidized bases. The FPG chemical recognizes oxidized bases as well as ring-opened purines got from some alkylation injuries at antacid circumstances. Bonassi et al. recently conducted a cohort study with 2403 healthy people has provided epidemiological evidence to support the use of the comet assay in non-communicable disease prevention strategies [3].

In the middle west of Germany, in the government province of North Rhine-Westphalia, is the Ruhr Locale, which is crossed by a similar named stream. with more than 5 megabytes It is Germany's largest urban agglomeration and one of the coal mining regions with the highest population densities worldwide. There, coal mining traces all the way back to the thirteenth century Promotion., with more modest pits that provided neighborhood utilization. In Germany, the double-dealing of coal was the prevalent economy for quite a long time.

***Corresponding author:** Jaime Oscar Restrepo, Department of Materials and Minerals, Universidad Nacional de Colombia, Colombia, E-mail: Jaime.os@baenares

Received: 02-May-2023, Manuscript No. jpmm-23-100670; **Editor assigned:** 04-May-2023, PreQC No. jpmm-23-100670 (PQ); **Reviewed:** 18-May-2023, QC No. jpmm-23-100670, **Revised:** 23-May-2023, Manuscript No. jpmm-23-100670 (R); **Published:** 30-May-2023, DOI: 10.4172/2168-9806.1000353

Citation: Restrepo JO (2023) Coal Mining's Long-Term Viability. Is Germany A Good Example for Colombia After Mining?. J Powder Metall Min 12: 353.

Citation: Restrepo JO (2023) Coal Mining's Long-Term Viability. Is Germany A Good Example for Colombia After Mining?. J Powder Metall Min 12: 353.

In the middle of the 19th century, Ruhr coal mining was the foundation for the iron-steel industry, energy production, and railway system, which were the most important parts of Germany's industrialization.

As per Harris, the extractive business strengthened in the Ruhr region throughout the long term so that by the start of the nineteenth hundred years, there were in excess of 100 mines [4]. This creator makes sense of that the typical yearly creation of coal per mine in this locale went from a portion of 1,000,000 tons in 1870 to 1,000,000 of every 1910, while by 1937 the Ruhr district alone delivered 128 million tons of coal. In this way, for a large part of the twentieth hundred years, the Ruhrgebiet was the main coal mining region in Europe, positioning second on the planet after Pittsburgh (USA). The region's strategic location close to Western European markets helped with this.

The contextual analysis: Mine outline

The coal mine that was the subject of the case study had a planned production capacity of 5.00 Mt/a, and the main coal seams were referred to as the #2 and #3 coal seams. Coking coal with a high economic mining value was in the second coal seam. Considering the impact of high mining dynamic stress and soft-rock support conditions at the top and floor, approximately 40 m section coal pillars were left in the mining process of the working face in the early stage of coal mining, resulting in a significant amount of coal resource waste. The thickness of the #2 coal seam was 2.8–4.2 m, with an average thickness of 3.5 m [5]. The thickness of the #3 coal crease was 2.4~3.2 m, with a typical thickness of 3.0 m. The plunge point of the coal crease was 1~3°, i.e., somewhat level, with a typically covered profundity of 650 m. Working face 3002 under study was situated in the south wing of the mining region II, with a strike length of 1260 m, a tendency length of 180.5 m~219.5 m, and a normal tendency length of 200 m, which was the region chosen for this review. The layout of the working face 3002's roadways.

The rock strata between the #2 and #3 coal seams was easily broken mudstone (gray-white argillaceous structure) with an average thickness of 1.5 m. The main overlying strata of the #2 coal seam consisted of mudstone, siltstone, medium sandstone, sandy mudstone, and so forth, as disclosed by the disclosure of adjacent boreholes of working face 3002 [6]. The floor of the #3 coal seam was composed of fine sandstone (with a structure The structure of the rock stratum was fairly stable. The entire drilling histogram of the area under study.

Underlying principle

The following steps are planned for the cooperative mining technology of close coal seams and overlying coal pillars. The lower coal seam is recovered through the face shearer, the front scraper conveyor is used to transport the lower coal seam, and the overlying coal pillar is released through the top coal caving support at the lower working face fully mechanized caving section [7]. This is accomplished by simultaneously arranging the top coal caving hydraulic support and fully mechanized mining hydraulic support at the lower close coal seam working face. In order to implement the cooperative mining technology of close coal seams and overlying coal pillars, it is then coordinatedly transported through the rear scraper conveyor, the fully mechanized mining section, the fully mechanized caving section, and roof supporting. After the upper coal pillar and the lower coal seam have been washed, the cleaned coal is moved to various coal bunkers and the released coal seam gangue is taken to the underground gangue bin for filling in the goaf. In order to separate the mining, transportation, and storage of various coal seams and coal gangue, the washing gangue is also transported to the underground gangue bin for filling [8]. The particular mining technique rule is delineated.

The coal conveying street of the lower coal mining face is situated external to the overlying coal support point, with an even distance of S. A belt transport and an exchange machine is organized in the street, and front and back scrubber transports are organized in the lower coal crease working face. The shearer mines the lower coal seam, which is then transported via the front scraper conveyor to the transfer machine in the transport roadway. The upper coal crease is moved to the exchange machine in the vehicle street through the back scrubber transport through buckling mining. In the lower coal seam and, below the coal pillar in the upper section, is the fully mechanized caving hydraulic support [9]. which does not have a coal pillar in the upper section, is where the fully mechanized caving hydraulic support is located. Because there is no coal on the upper roof, the fully mechanized caving hydraulic support's caving opening at section S of the mining face outside the coal pillar is permanently closed. This is done to prevent excess rock from mixing with the caving support's rear scraper conveyor [10]. The framework format of the technique.

The mining effect and safety of this method are influenced by a number of technical parameters, such as the width of the coal pillar, the horizontal spacing between the lower coal roadway and the overlying section coal pillar, and the working face length. Appropriately choosing the even dispersing S ought to limit the pressure impact scope of the coal support point in the overlying area to guarantee the dependability of the street encompassing stone. The determination of a sensible segment coal support point shouldn't just meet the necessities of boosting the recuperation pace of coal assets yet in addition diminish the ground pressure power in the functioning face to guarantee the protected and effective creation of the functioning face. The working face ought to be longer than the sum of the section coal pillar's length L and the horizontal spacing's length S. The basic affecting specialized boundaries.

Cd Distributions in wheat and soils

The concentrations of Cd in soils and wheat: The soil Cd concentrations in the Linhuan coal mining region are shown. Soils had Cd concentrations ranging from 0.07 to 0.34 mg/kg, with an average of 0.17 mg/kg. According to AHEMC, 1992, CNEMC (The Chinese Environmental Monitoring Centre), 96.67 percent of soil samples had a Cd content that was higher than the Huaibei soil background value and 70 percent had a Cd content that was higher than the Chinese background value. The maximum permissible concentration of Cd in agricultural soils at a pH below 7.5 is set by the soil environmental quality risk control standard for contamination of agricultural land. 17.24 percent of the 58 soil samples exceeded the Cd risk screening value, indicating that the soils in the study area were somewhat contaminated. In the study area, Cd in soils varied widely, with a CV of 48.89 percent, suggesting that human activities may have contaminated the soil with Cd.

Heavy metal concentrations in wheat's various tissues varied significantly across the board. Table 1 also shows the concentrations of Cd in wheat roots and grains from the study area. With mean values of 0.23 and 0.04 mg/kg, the Cd concentrations in wheat grains and roots were within the range of 0.07–0.43 mg/kg, respectively. The groupings of Compact disc in various tissues of wheat showed a pattern: wheat roots > wheat grains, demonstrating that Cd may be all the more effectively amassed in wheat roots. Using the Chinese national food quality standard the grain sample for S48 exceeded the limit value, while the other samples were within the safe range [11].

Citation: Restrepo JO (2023) Coal Mining's Long-Term Viability. Is Germany A Good Example for Colombia After Mining?. J Powder Metall Min 12: 353.

The correlations between the concentrations of Cd in wheat roots and soils/wheat grains showed that the correlation between the concentrations of Cd in wheat grains and those in wheat roots was positive (R2 = 0.9186), while the correlation between the concentrations of Cd in wheat roots and those in soils was also positive (R2 = 0.9168). Accordingly, the Cd focuses in wheat grains were connected with the Compact disc fixations in soils. This was in line with the following data: the wheat grain (S48) that was grown on the soil with the highest Cd concentration had a relatively high Cd concentration.

Cd in wheat grains: a risk assessment for human health: The HQ and ILCR values of Cd were calculated to assess the human health risks of adults and children consuming Cd-containing wheat grains grown in the study area. The outcomes are shown. Adult HQs ranged from 2.29E-04 to 1.53E-03, while children's HQs ranged from 5.00E-04 to 3.34E-03 [12]. According to USEPA there was no non-carcinogenic risk associated with the wheat grains in the study area because all of the HQs for adults and children were significantly below 1. In the interim, the ILCR of grown-ups was between 5.98E-07 and 4.00E-06, and that of kids was between 4.36E-07 and 2.91E-06, separately. By alluding to the most extreme OK gamble esteem recommended by the USEPA a piece of the ILCR upsides of Disc were between 10-6 and OK, showing that the ingestion of wheat grains by grown-ups and youngsters in the review region had a specific level of cancer-causing risk, however the gamble was inside an OK reach. To lessen the carcinogenic risk and reduce the impact of Cd on human health, appropriate remediation measures are required for Cd-contaminated soils in the coal mining region [13-17].

Conclusion

In this review, a field overview was directed to examine the conveyance, gathering, and human wellbeing risk evaluation in light of the MCS of Cd in soils and roots and grains of wheat plants filled in the Linhuan coal mining region. 17.24 percent of soil samples exceeded the safety threshold when compared to the risk screening value for Cd in agricultural soils (GB, 5618–2018), indicating that soil Cd pollution was prevalent in the study area. The spatial distribution of Cd in soils demonstrates that industrial and coal mining activities had a significant impact on its presence. Even though soils contained high levels of Cd, Cd accumulation in wheat grains was limited, as the mean BCF>1 and TF1 demonstrated. The convergences of Disc in soils, soil properties, and soil Cd speciation impacted the Cd collection in wheat grains, which recommended that further developing soil conditions was a doable procedure to lessen the Cd fixations in wheat grains. The human wellbeing risk evaluation showed that albeit the utilization of wheat grains had no non-cancer-causing risk for grown-ups and youngsters, it could bring a specific cancer-causing risk following delayed openness. In addition, MCS's uncertainty analysis came to the same conclusion as the risk assessment for human health. BW and EF had a significant impact on both non-carcinogenic and carcinogenic health risks for adults and children. We should pay more attention to soil quality and food safety in coal mining areas, and this study would provide strong recommendations and management strategies to limit the accumulation of Cd that degrades farmland used for wheat cultivation.

Acknowledgement

None

Conflict of Interest

None

References

1. Bi Y, Zhang J, Song Z, Wang Z, Qiu L, et al. (2019) Arbuscular mycorrhizal fungi alleviate root damage stress induced by simulated coal mining subsidence ground fissures. Sci Total Environ 652: 398-405.
2. Bi Y, Xiao L, Sun J (2019) Integrated method of RS and GPR for monitoring the changes in the soil moisture and groundwater environment due to underground coal miningAn arbuscular mycorrhizal fungus ameliorates plant growth and hormones after moderate root damage due to simulated coal mining subsidence: a microcosm study. Environ Sci Pollut Res 26: 11053-11061.
3. Rosenberg K (2017) Prediabetes Increases Risk of Cardiovascular Disease. Am J Nurs 117: 71.
4. Huang Y, Cai X, Mai W, Li M, Hu Y, et al. (2016) Association between prediabetes and risk of cardiovascular disease and all cause mortality: systematic review and meta-analysis. BMJ 355: i5953.
5. Vaidya RA, Desai S, Moitra P, Salis S, Agashe S, et al. (2023) Hyperinsulinemia: an early biomarker of metabolic dysfunction. Front Clin Diabetes Healthc 4: 1159664.
6. Richter B, Hemmingsen B, Metzendorf MI, Takwoingi Y (2018) Development of type 2 diabetes mellitus in people with intermediate hyperglycaemia. Cochrane Database Syst Rev10: CD012661.
7. Zhu X, Cao L, Liang Y (2019) Spatial distribution and risk assessment of heavy metals inside and outside a typical lead-zinc mine in southeastern China. Environ Sci Pollut Res Int 26: 26265-26275.
8. Ding Q, Cheng G, Wang Y, Zhuang D (2017) Effects of natural factors on the spatial distribution of heavy metals in soils surrounding mining regions. Sci Total Environ 578: 577-585.
9. Feng XY, Yu XZ, Zhang H (2021) A modelling study of a buffer zone in abating heavy metal contamination from a gold mine of Hainan Province in nearby agricultural area. J Environ Manage 287: 112299.
10. Milman S, Crandall JP (2011) Mechanisms of vascular complications in prediabetes. Med Clin North Am 95: 309-25.
11. Fattore C, Abate N, Faridani F, Masini N, Lasaponara R, et al. (2021) Google Earth Engine as Multi-Sensor Open-Source Tool for Supporting the Preservation of Archaeological Areas: The Case Study of Flood and Fire Mapping in Metaponto, Italy. Sensors (Basel) 21: 1791.
12. Guan Y, Wang J, Zhou W, Bai Z, Cao Y, et al. (2022) Identification of land reclamation stages based on succession characteristics of rehabilitated vegetation in the Pingshuo opencast coal mine. J Environ Manage 305: 114352.
13. Izydorczyk G, Mikula K, Skrzypczak D, Moustakas K, Krowiak AW, et al. (2021) Potential environmental pollution from copper metallurgy and methods of management. Environ Res 197: 111050.
14. Shen H, Forssberg E (2003) An overview of recovery of metals from slags. Waste Manag 23: 933-49.
15. Kelly AE, Goulden ML (2008) Rapid shifts in plant distribution with recent climate change. Proc Natl Acad Sci U S A 105: 11823-6.
16. Breshears DD, Huxman TE, Adams HD, Zou CB, Davison JE, et al. (2008) Vegetation synchronously leans upslope as climate warms. Proc Natl Acad Sci U S A 105: 11591-2.
17. Alatalo JM, Ferrarini A (2017) Braking effect of climate and topography on global change-induced upslope forest expansion. Int J Biometeorol 61: 541-548.