

## THE IMPACT OF THE MINING ACTIVITY ON THE ECONOMIC SECTOR, HUMAN HEALTH AND ENVIRONMENT

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**Abstract:** *It is estimated that the EU's energy mix will still rely heavily on fossil fuels, including coal, and the countries of Central and Eastern Europe, coal will be the main pillar of energy security, even to the year 2035. Therefore, this paper aims to capture the efforts made by the Romanian state in an attempt to streamline existing coal mines and close those that were no longer profitable, showing the impact of the economic sectors in terms of the economic, social and natural.*

**Keywords:** *dust, coal, occupational disease, environmental degradation, environmental restoration.*

### 1. Introduction

Everything started a long time ago for many areas in Romania that used to hold coal deposits. Back then, there was a hill that turned later into a coal mine and, after many years of exploitation, it reached the shape of a valley.

This deposit has had a significant meaning for that area, having both an advantage and also a disadvantage. On the one hand, mining has brought employment in the area, thus contributing to the development of this area from an economic perspective but, on the other hand, it has damaged the environment and the health of the residents.

Among the areas in Romania that used to and still have coal deposits are Valea Jiului (Petrila, Uricani, Paroseni, Aninoasa, Lonea, Livezeni, Vulcan, Lupeni), county of Brasov (Codlea), county of Covasna (Bodos, Baraolt), county of Bacau (Comanesti), county of Arges (Cotesti) etc. Of all these mines, the following are still operating: Valea Jiului - Petrila (until the end of 2015), Uricani and Paroseni (until the end of 2017), Lonea, Livezeni, Lupeni, Vulcan. The others have been closed, such as Comanesti (county of Bacau) in 2005, Mina 1 Mai in Codlea (Brasov County) in 1961, Bodos and Baraolt Mines in the county of Covasna, Cotesti Mine in the Arges County in 2002.

In Copsa Mica, lampblack has been produced for years on end, made from charcoal and used in the rubber processing, manufacturing the printing ink and some black paints. As a consequence of this economic activity, both the environment and the people were contaminated and harmed.

In time, the coal mines have been depleted from their resources, a reason for which the mining activity has required a significant financial aid from the Romanian Government. Similarly, these areas have been confronted with a surging number of unemployed people, an increase in the poverty level of the residents. The health condition of those people has worsened and many profession-related diseases have emerged, due to this economic activity.

### 2. Content paper

The closing of the mines has triggered a considerable damage to the environment. In some areas, though, this operation has been done via environment-friendly methods, which means that the vicinities of the mine are clean and not polluted with toxic waste. This has been possible by a World Bank project that had the mining villages overcome their condition.

The main purpose was to close the mines, thus having a minimum impact upon the environment. Finances have also been provided for improving the infrastructure and the services for the former mine workers and their families and for creating more employment places.

The general objective of the Government Strategy for the mining sector 2004-2010 was to turn the mining industry into a lucrative sector and to support the economic increase, as well as a durable existence in the mining regions in Romania, with the purpose to assist the economic integration of Romania into the EU. The mining strategy approved by the Government in April 2004 aimed to wipe out all the subsidies granted to the state mines of minerals and metals until 2007 and for the coal mines until 2010.

A number of over 20 mines were successfully closed between 2005 and 2010. Their closing affected circa 650,000 people, who were later helped with services of professional conversion and programs of creating employment.

Due to its nature, the entire mining activity triggers multiple and various negative effects on the environment, such as:

- Changes in the landscape, manifested by the degradation of the scenery and relocation of the households and of the industrial objectives in the exploitation areas;
- Occupancy of large areas of land for the exploitation activity, stockpiling, storage of the useful mineral substances, industrial equipment, access roads, etc, surfaces that thus became useless for other purposes, for long periods of time;
- Degradation of the land, by vertical and horizontal slides of the surface and the drifting of the dumps and of the drainers, leading to serious accidents;
- Contamination of the surface running waters and of the ground waters;
- The hydrodynamic imbalance of the underground waters;
- Negative influences on the atmosphere, flora and fauna in the area;
- The chemical pollution of the land that can lead to its loss of fertility;
- Noises, vibrations and radiations spread in the environment, with a strongly unfavorable action;

The impact of the mining industry upon the environment can be described in a nutshell, via the following features that are relevant for this economic branch:

- The mining projects should include stipulations regarding the preservation of the biodiversity;
- The reduction to minimum of the derived waste, from production and consumption, which will contribute to the prevention of generating waste and to the reuse, recycling and transformation of the waste into products;
- Improvement of the recycling process and of the reuse of water and other natural resources;
- The implementation of the European legislative framework at the national level for the mining industry with the purpose to design the storage equipment, of decantation and management of waste, of closing, post-closing and reparation of the abandoned mining sites, so that they will have an ignorable risk for the public health, environment and also a low social and environment effect during the operation and after closing.

The exploitation of the coal deposits has also a significant impact upon the health of the people working and living in the areas of these deposits. The mining activity leads to the ground pollution, of the water and to building residues in the atmosphere.

The air pollution has harmful effects upon health, from minor breathing symptoms for short periods of time to increasing of mortality and morbidity (mainly in breathing), in association with longer episodes of a higher or sustained exposure to this contamination.

To prevent the decay due to the exposure of the population to various pollutants in the atmosphere, prophylaxis is the key. To this purpose, there should be focused on maintaining the concentration of the toxic substances in the environment under the maximum admitted value, in accordance with the current legal norms.

The respiratory system is the most vulnerable to the pollutants in the atmosphere and to the toxic stimuli in the air (allergens and the cold air). The breathing apparatus comprises superior airways (nose, pharynxes and larynxes) and inferior airways (trachea, bronchi and the lung alveoli). The trachea, the bronchi and the lungs are intrathoracic internal organs that have a direct

communication with the atmosphere and the exterior world, due to their tubular shape, and they are exposed to the action of the existent pollutants in the air.

The most frequent maladies of the respiratory system, triggered by the atmosphere pollution, are coughing and bronchoconstriction, tracheitis, bronchitis, asthma, chronic obstructive lung disease, pulmonary abscess, pneumonias and bronchopneumonia, pneumoconiosis and lung tumors.

While considering the chronic effects of the irritant atmosphere pollutants, they need to be looked at from the perspective of long-term exposure (5-10 years) at relatively high concentrations.

The pathology due to the atmosphere pollution holds an important place in the evaluation of the impact upon the health condition. It is unavoidable and absolutely normal to have the health of the population depend on the quality of the environment factors (air, water and ground), which indirectly or directly affect the human health.

The air pollution is a major factor in triggering such disorders. The irritating ability of the powders in suspension increases when there are other disturbing pollutants for breathing in the air (SO<sub>2</sub> and NO<sub>2</sub>, thus having the synergistic effect manifested between SO<sub>2</sub> – powders in suspension and NO<sub>2</sub> – powders in suspension.

In the areas that register higher admitted limits of concentration (the powders in suspension, mainly the ones with micron and sub-micron dimensions), the respiratory system of the children is firstly affected, by leading to pneumonias, bronchitis, asthma or emphysema; their eyes can be irritated (conjunctivitis) and so can their skin. These powders are able to reach the respiratory apparatus to the alveolar level, where there are no specialized mechanisms to dispose of them.

The soluble particles will be directly absorbed into the circulation and the indissoluble ones are embedded in the macrophage, responsible with the chronic inflammation, associated with the release of intracellular mediators of the inflammation that will raise the blood viscosity and the coagulability, thus making it possible for vascular accidents or decompensation of preexistent cardiac insufficiencies.

The agents in the particles as carbon, coming from coal burning, have been posing a problem in the air pollution for many hundreds of years. The air pollution parameter that is the closest linked to the increase in the decay or mortality rate is the concentration of breathable particles. The atmosphere pollution based on powders has a stronger effect upon the human health than the one directly derived from the polluting gases.

According to the definition provided by the World Health Organization, 'the professional diseases are affections whose specific etiological agents are present at the employment place, associated with certain industrial processes or with the performance of certain professions'.

The concept of 'professional disease' involves the existence of a causality relation between the risk factors present in the work process and their effect, visible in the emergence of the disease.

In Romania, the 'professional disease' represents the affection that derives from performing a certain job or profession, caused by toxic factors (physical, chemical or biological), particular to the employment place, as well as by the overstressing of various organs or body systems during the work process.

The social impact of the mining activity can lead to the following:

- Increasing the production costs, due to the compulsoriness to provide further conditions of work safety and healthy and environment protection;
- High social vulnerability, from the mono-industrial nature of the area, of the degradation in the financial situation and downsizing, where is no other real economic alternative;
- The dependence of the production on the operation of the thermal power stations;
- The lack of a regulated price, close to the production cost;
- The lack of funds for an extensive development of the exploitation;
- Slim chances of providing the investment demand for the capitalization of the viable mines, during the present organization system.

The mining industry must bring a significant contribution via rents, royalties and other transparent payment methods, to a fair distribution among the earnings of the companies, the local authorities and of the Romanian state.

The promotion of the internal resources in the national economic circuit has been one of the items on the Agenda G20. To this perspective, the strengthening of the fiscal regime in the mining sector

and of the related fiscal policies can build a platform of durable income for the local and national economic growth.

The mining activities subscribe to the durable development provided that they generate appropriate and reasonable income. The officials of the mining industry and the state have to cooperate for a strong and balanced fiscal regime, as well as for a good management of the financial resources, required to guarantee long-term benefits.

### 3. Conclusions

The recent capacity of energy generation for trapping and storing the carbon helps with reaching the objectives of climate protection and supply security.

Similarly, the latest emergent technologies of capitalizing the coal deposits (the underground distillation, the methane in the coal layer, etc) can change the significance of the coal in the energetic mix.

A modern, efficient and a highly lucrative company has to adopt the most adequate knowledge and technologies, use the best practices and most modern management methods, in order to maximize the economic benefits from the exploitation of a mineral substance, for all the interested parties, including in the ecological reconstruction of the areas affected by mining activities.

The supporting of the economic environment in order to lessen the effects of the economic critical situation and to sustainable develop the current economic operators and also to assist with establishing new ones, all these fall into the jurisdiction of the local and central administrations.

The work accidents and the professional diseases have a negative impact on all the elements involved in the work system: the worker, the work duty, the production means and the labor environment.

In the context of the work process, the human can be perceived from two angles: of a human being and of a worker. Every angle is associated with a series of specific values and features, such as life, health, the anatomical and functional integrity, the creative and affective ability, the work capacity, skills and knowledge.

The work accidents and the professional diseases have repercussions on both categories of values, and the consequences are visible in multiple plans:

- psycho-physiological: pain, stress, inability to work, disability, etc;
- economic: reduction in the efficiency of the individual work;
- financial: income lowering, expenses for medical care.

The direct consequence is the non-fulfillment of the work duties or their untimely (especially for the work accidents), as well as improper performance (for some professional diseases, unless the temporary work inability stage has been reached).

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