© University Press 2020
ISSN 2719-6550
ISSN 2719-7417 online

„Journal of Education, Technology and Computer Science”
No. 1(31)/2020
www.eti.rzeszow.pl

Received: 1.06.2020
Accepted for printing: 3.08.2020
Published: 05.11.2020

DOI: 10.15584/jetacomps.2020.1.7

KOJI CRISTOBAL ISHIMI PERNY[1], **WIKTORIA SOBCZYK**[2]

The Anthroposphere and Mining Activities

[1] AGH University of Science & Technology; Universidad Politécnica de Madrid, Spain
[2] ORCID: 0000-0003-2082-9644, Professor PhD. D.Sc. Eng., AGH University of Science & Technology, Faculty of Mining & Geoengineering, Poland

Abstract

This article presents some aspects of goals and tasks of sustainable development. The theoretical preliminary analysis of environmental hazards in mining in the anthroposphere is described. The publication is focused on influencing people and environmental elements that affect people's living conditions.

Keywords: sustainable development, anthroposphere, mining

Introduction

The main objectives of sustainable development are making sure that the needs of the present are met without compromising the ability of future generations to meet their own needs, but also providing the society with a long-term perspective on development prospects (WCED, 1987).

Seeking harmony, the effect of which is sustain-ability of development, is achieved through paying special attention to protecting the natural environment and ensuring social growth potential that follows economic growth. Protection means care for the natural environment and its resources so that they could be used – in an undeteriorated state – by future generations. This means focus on education, healthcare, safety and proper living conditions of human beings so that the social growth potential of future generations is preserved (Piecuch, Hewelt, 2013). In this way one can provide protection of rare assets and resources, thus making it possible to maintain sustainability of development.

Due to the accelerated development of modern societies and the necessity of resources to sustain this expansion, the environmental damage has increased at

a level in which a priority in our society at a global level, is the need of sustainable development where the protection of the biosphere from human beings is guaranteed. This is a natural born requirement in which the adverse effects of human activity on the environment must be controlled, regulated and minimized in order for our species to keep benefiting from the resources that make possible our survival and development. A critical implement in this regulation to achieve sustainable development is the Environmental Impact Assessment of different projects and aspects carried out, that imply any type of alteration of the natural ecosystem, to ensure its preservation (Brutland, 1987; IUCN, 2018).

The process serves us to evaluate and analyse the conditions generated in the environment to make the best choices regarding this concern. Mining is one of the most influential fields for our specie in terms of the provisioning of resources for the human race, there is a constant and fluctuating demand of minerals to preserve and improve our development and way of living, but as opposed it, is also one of the most harmful practices to our environment from different angles if not supervised and regulated.

Social impacts

Social impacts created by big scale mining are controversial and complex. Mining development may produce a lot of economic benefits but also big alterations. Mining projects propose the creation of employment, roads, schools, and to increase the goods and services in poor and isolated zones, but the costs and returns may not be equally distributed. If communities feel that they are unfairly treated or that their compensation is not just, mining projects can lead to social and violent conflicts.

Mining industry might underestimate or even ignore their project´s impact on the local population. When the relation between communities and authorities are weak or the environmental impacts implied on mining affect the subsistence and support of the local population, communities feel very exposed.

A sense of social deprivation may flourish in communities when there is an unbalanced power when facing changes and effects implied in projects carried by big and powerful foreign companies. Environmental risk assessment might include a way to allow the local population to take an effective role in decision making processes. Extractive activities should ensure the protection and fulfillment of the fundamental individual and collective rights, which includes the right to own and use the land, to clean water, to enjoy a safe environment and lifestyle, the right against intimidations and violence and fair compensation in case of loss.

The displacement of established communities can lead to conflicts with large scale mining projects. Communities lose their lands and as a consequence their means of livelihood, creating a disturbance in their community institutions

and power relations. Entire communities might be forced to move to settlements with no resources access, built for that purpose, or to stay close to mines where they are exposed to contamination. The resentment is much bigger and devastating to native indigenous communities with big cultural and spiritual roots in their lands.

One of the biggest impacts in mining activities is the people migration to mining settlements where the economic activity is centred. The sudden population increase leads to higher pressures on land, water and other resources and more waste management and sanitation problems (Sobczyk, Kicki, Sobczyk, Szuwarzyński, 2017).

Effects might be extended longer than the mining surroundings, as the infrastructure improvement may attract more settlers.

One of the most important mining impacts on the population is the one affecting the quality and amount of water supply. Even though the industry insists in the use of modern technologies that ensures the preservation of the environment, there are overwhelming evidences that prove the negative impacts of mining activities and lack of environmental legislation fulfillment which contributes to create a mistrust feeling among local population located downstream mining facilities, as they are worried with the negative effect on their water supply. It may affect the maintenance of local families' water supply or even the solvency of national governments. These fears concerning the quality and amount of the water supply may lead to the numerous and sometimes violent conflict between miners and communities.

If mining activities are not properly managed and controlled they can lead to a ground, water, biodiversity and forest resources disturbance among other demands needed for local productive activities and local population subsistence. When there is an uncontrolled contamination, the effects may be altered to other economic activities such as agriculture and fishing. The problem gets more severe as many times extractive activity takes place in zones inhabited by historically outcasted and excluded populations.

Mining projects must ensure that individual and collective fundamental rights are not endangered, these rights include the right to control and use the land, to clean water and to sustenance. Those rights must be ensured by the legislation, organizations and international human rights treaties. The interests of the most vulnerable groups must be identified and protected.

Human health

Mining projects often do not correctly evaluate potential risks that toxic substances and waste products in water, air or land may have on human health. The World Health Organization defines health as the complete state of physical, mental and social wellbeing not only as the absence of disease (https://www.who.int).

Dangerous substances due to the amount, concentration, and physical, chemical or infectious properties may cause or contribute to the increase of mortality or to the increase of severe or disabling diseases; or represent a potential risk for human health or the environment if not properly treated, stored, transported or managed.

Problems created on human health by extractive activity commonly include:

– hydrosphere: surface and underground water contamination with metals, elements, microorganisms from sewers or drainages and waste from settlements and workers, residences,

– atmosphere: exposure to high concentrations of SO_2, particles, heavy metals including, plumb, mercury and cadmium,

– litosphere: precipitation of toxic elements suspended on atmospheric emissions.

Extractive activity impacts may severely affect the air quality and physical, mental and social well being. Mining improvised settlements commonly affect the food disposal and security (quality and amount) increasing the malnutrition risk, not only due to the exposure to harmful substances but also by nutritional deficiency. Many times mining projects create a visible indirect impact on population´s health such as an increase of tuberculosis, asthma, chronic bronchitis and gastrointestinal diseases among the population.

Mining and sustainable development

The mining and metallurgical industry is one of the most influential pillars of the economy, not just to provide material needs for the industrialized world, but also to ensure and support the growth of developing countries. The materials and products consumed by all countries, especially those who are still developing their economy and basic needs, are provided directly or indirectly through their extraction from the natural environment by the mining sector. At a lower scale mining is also considered to have an important role in the economy at a local level due to investment and job market increase. Mineral resources are a very profitable option to increase the economy of a country, just by the extraction and exploitation of resources, if the treatment and transformation to consumer goods is not possible or efficient enough. As opposed, mining has a very negative image from the social and cultural point of view, as it is associated with high contamination levels and degradation of the biosphere due to the uncontrolled human activity and the adverse effects provoked in the environment on its process. These socio-cultural agents can't be ignored and must be assisted to develop the industry and change its negative view. It is necessary to point out that even though the defense of the environment is a crucial and very important aspect, is not the only factor that determines the social acceptance of the extractive industry. In many occasions there is mutual interest from both parts (mining

corporations and social communities) in land acquisition, water owning payments, present of subcontractors, compensation, local purchases, social investment strategies etc. To make mining socially accepted is impossible to omit the creation of measures from a legislative level, combined with a good execution of the activity regarding their environmental impact and an ethical motivation in the design of the processes involved. The alteration of the biosphere is implicit on mining activities, so every mining project must consider the management of the effects they cause on the environment, starting with design and business decisions. The industry must ensure the preservation of the environment and consider it a main step in the typical cycle involved in mining activity (prospecting/ exploration, development, mineral extraction, metallurgic process and closure/ reclamation).

Literature

IUCN Environmental Law Centre and IUCN World Commission on Environmental Law (2018). Entrance: 29.05.2020.

Brutland Report (1987). Retrieved from: http: //www.ecominga.uqam.ca/PDF.Medio.pdf (29.05.2020).

https://www.who.int (29.05.2020).

Piecuch, I., Hewelt, G. (2013). Environmental Education – First Knowledge and Then the Habit of Environment Protection. *Annual Set The Environment Protection*, *15*, 136–150.

Sobczyk, E.J., Kicki, J., Sobczyk, W., Szuwarzyński, M. (2017). Support of Mining Investment Choice Decisions with the Use of Multi-criteria Method. *Resources Policy*, *3*, 94–99.

WCED World Commission on Environment and Development (1987). *Our Common Future*. New York: Oxford University Press.