EVALUATION OF SUSTAINABLE DEVELOPMENT INDICATORS IN THE REGION AFFECTED BY THE BRUMADINHO DISASTER

Ricardo Peiter Carpenter Ferreira
Bolsista PIBIC, Engenheiro de Produção.

José Antônio Sena
Supervisor, Geógrafo, Tecnologista Senior CETEM

SUMMARY

Socioeconomic and Environmental Sustainability indicators are used to characterize parts of the territory affected by certain economic activities. Mining is the main economic activity of many municipalities in Brazil, generating wealth, but at the same time may cause significant environmental impacts. The methodology of sustainability indicators of sustainable development goals (SDG) can be used as reference for the construction of indicators that evaluate the multidimensional perspective involving the sustainability of projects miners. In this work it was done a case study for the set of 20 municipalities in the area of direct influence of the disaster occurred in the municipality of Brumadinho (MG) selected according to the criteria adopted by IBGE, it considers the impact on the watershed and municipalities about direct economic influence.

Keywords: Brumadinho, mining, sustainable development goals, indicators, mineral economics.

1. INTRODUÇÃO

In order to characterize the situation of the municipalities affected by the destruction of the Brumadinho dam, a preliminary study was carried out using the available information on the living conditions and the economy of these municipalities. This characterization allowed to evaluate the cities were situated before the disaster in the perspective of Sustainable Development Indicators (SDG). For the study, we used, preferably, historical series of half-yearly information over a period of 10 years, from 2005 to 2015. This format was chosen mainly because of the possibility of reconciling socioeconomic data with data on education, IDEB, which were available only in that format.

2. GOALS

The overall objective of this project is based on monitoring the performance of the affected municipalities based on the document review of the SDG and the official indicators targets of Brazilian Institute of Geography and Statistics (IBGE).

8 SDG were selected for an evaluation of the impacts and dynamics involving the disaster of Brumadinho, in all municipalities potentially affected. It is observed through the data collected, the socio-economic landscape of the municipalities involved and some potential revealed the light of SDG.

3. METHODS

From a bibliographic review and documentation it was structured the methodology of this research, which consists in the systematization of a set of 8 indicators for the 8 goals that have a direct relation with the main environmental, social and economic issues identified in the direct influenced area of Brumadinho. Using as references to the work carried out in Mineral Technology Center – CETEM, through the Group of Mineral Economics and sustainability studies, these indicators were evaluated, and through them was made an analysis of the social components environmental and economic, identified as relevant to the field of study.

4. SDG AND THE INDEX SELECTED

The index and goals chosen for the study was:

SDG 1 – No Poverty (measured by the evolution on the number of Families Enrolled in the CadÚnico with per Capita household income of up to 1/2 minimum wage).

The ODS 1 deals with poverty, whose eradication is understood to Brazil as the focal point for the entire sustainable development strategy.

To realize this goal, the country will need to establish new political milestones to ensure that social protection systems reach the most poor and vulnerable individuals, to achieve that mark, there is the goal 1.3 (Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable).

The Cadastro Único is a Social Programs from the Federal Government which is used as an instrument that identifies and characterizes the low-income families, allowing the Government to learn more about the economic reality of this population. It is recorded information such as: residence characteristics, identification of each person, education, work and income situation, among others.

SDG 2 – Zero Hunger and sustainable agriculture (measured by the area planted or intended for the crop in Hectares, the area harvested in Hectares and production value (thousand Reais) for permanent and temporary crops).

During the last two decades, the rapid economic growth and agricultural development were responsible for the reduction of half of the proportion of undernourished people in the world. The SDG 2 intends to end all forms of hunger and malnutrition in order to ensure that all people-especially children have sufficient access to nutritious food during every year.

One of the proposals from the SDG 2 is the 2.4:

By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

SDG 3 – Good Health and Well-Being (measured by infant mortality rate).

One of the proposals from the SDG is the 3.2:

By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births.

One of the major indexes to calculate the living conditions and health status for children is the infant mortality rate that we will use in our work.

SDG 4 – Quality Education (measured by the basic education development index (IDEB)).

Among the goals for the SDG 4 there is the 4.1 which is:

By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and Goal-4 effective learning outcomes.

The index chosen to mesurar the quality of education in the municipalities was the IDEB in the early years of elementary school.

The basic education development index (Ideb) was created in 2007 and brings together, in a single indicator, the results of two equally important concepts for a quality education: the school flow and the performance evaluations.

SDG 8 – Decent work and Economic Growth (measured by GDP per capita).

8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries.

SDG 9 – Industries, Innovation and Infrastructure (measured by the number of units of businesses and other organizations, total staff busy, busy and salaried personnel total salaries and other remuneration in thousand Reais).

9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.

The Index chosen to analyze this goal it was the number of businesses and other organizations.

9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries.

The Index chosen to analyze this goal it was the total number of person employed and busy employee.

SDG 13 – Climate Action (measured by value of output in forestry in thousand Reais).

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

13.2 Integrate climate change measures into national policies, strategies and planning.

We chose this index because according to the Portuguese dictionary, forestry is the science dedicated to study the natural and artificial methods to regenerate and improve the forest stands and which includes the botanical study of the species, in addition to identifying, characterization and prescription of the use of wood. Studies show that forests and natural ecosystems store large amounts of carbon, both in vegetation and soil structure. In comparison with the forests of temperate climates, tropical forests are denser and lower seasonal fluctuations in carbon flow, becoming as important carbon stocks which contribute to the stability of the global climate.

Deforestation and forest degradation are activities that emit greenhouse gases (GHGs), particulary carbon dioxide (CO_2), which cause climate change. According to the Intergovernmental Panel on climate change, forests and other land uses have had 12% stake in global emissions in the period from 2000 to 2009.

SDG 16 – Peace, Justice and Strong Institutions (measured by the number of deaths that occurred in the year with a violent nature).

16.1 Significantly reduce all forms of violence and related death rates everywhere.

5. PRELIMINARY RESULTS

The data were organized and analyzed, serving as a subsidy to the identification and mapping of areas with more vulnerability to the negative effects of the disaster. This methodology also served to identify areas potentially impacted by the outage more mining (economic and social costs).

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