Socioeconomic impact of the local productive cluster of dimension stones of the Espírito Santo State, Brazil

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Abstract. This paper shows one of the case-studies of the “Large Mines and Mineral-Based Local Productive Clusters X Local Communities”. The project aimed to assess the impact of mining on socioeconomic development of the communities that lie within the area of influence of that activity. To achieve this, 15 case studies were carried out along the country: 10 large mines and 5 clusters. In each of them the perception of the mining and surrounding communities on the impacts of mining were analyzed. Although the mineral sector in Brazil relies on large mining projects, particularly iron, gold and other metals, more than 70% of the country’s mines are small and medium businesses, which have great importance in local development and the setting of population in interior regions. Small mines often find themselves in productive clusters, especially those of rocks, industrial minerals and gemstones. The so called “Local Productive Clusters” – APLs (from Portuguese Arranjos Produtivo Locais) have a specific policy support. The case here presented is that of APL of Dimension Stones of the State of Espírito Santo. The methodology consisted of extensive literature review and field data collection through a survey research of the population perception, and interviews with city halls, mining companies, NGOs and other local institutions and final data analysis. In studies of large mines this survey is done in the county where the mine is installed and in a neighboring county, in order to obtain a broader dimension of the impact of mining in society. In the case of clusters, consisting of many mines, and in the specific case of the State of Espírito Santo, it was necessary, before doing the field work, to define what would be considered the “mining county” and, more difficult, which would be the “neighboring county”, based on socioeconomic data from various national and state institutions. In order to make the most comprehensive study, we considered the APL of Dimension Stones of the Espírito Santo divided into two clusters: the Southern Cluster, the most important processing pole of the country, more developed, with the largest reserves of Brazilian marble and more companies of all production chain, and the Northern Cluster, younger, the main granites production area and high growth potential. The “mining or quarrying counties” selected were Cachoeiro de Itapemirim, on the Southern Cluster, and Barra de São Francisco, Nova Venécia and Vila Pavão, on the Northern Cluster. The “neighboring counties” selected were Jerônimo Monteiro and São Domingos do Norte, respectively. In total, 541 people, and 11 institutions were interviewed. After analyzing the results of the literature and interviews with the public and representative bodies, in the perception of respondents, there was an improvement in quality of life and increased employment and income and the only impacts noticed were dust and noise. It was observed that a major impact as the degradation of the roads was not perceived by the population and neither the low tax collection which should return in investments by the city halls. It was also observed that there is no social responsibility practices by dimension stones companies. As a result of this work, we can conclude that the communities are satisfied with mining and the economic impact is so important to them that it masks the negative impacts, for which respondents showed little sensitivity.
Introduction

Brazil has one of the largest mineral deposits of the world and is one of largest mineral producers and exporters. In 2011, Brazilian Mineral Production (BMP), estimated by the National Department of Mineral Production (DNMP), was of US$48 billion [1]. That production becomes from large mines and a big number of small and artisanal mines, in most cases inserted in local productive clusters – APLs (from Portuguese Arranjos Produtivos Locais). Being very important for the development of interior regions, Brazilian government has specific policies for APLs support and has been making many efforts, since ten years ago, to address the small producers for the legalization and implementation of good practices in their endeavors.

Brazilian mining was for many years an example of unsustainable growth, leaving social and environmental liabilities in many regions where it developed. Since 90s of last century, the environmental management of this activity has greatly improved, especially by the introduction of strict environmental legislation. However, only in recent times that Brazilian mining tries to follow the guidelines and concepts of sustainability as defined in Agenda 21 of Rio 92 and extended in 2002 at the Conference in Johannesburg, which go beyond good environmental practices. Society participation in decision-making processes that refer to activities that affect the local environment, has led to ever more pressure and there is a legal requirement for Triple License: Mining Rights, Environmental Permits and Social License, essential to the functioning of economic mineral extraction activities. So, today, both new ventures and those who are already in operation, they require guarantees of sustainable development minimizing any environmental damage, and granting the social and economic development in an integrated way, being necessary consultation, local participation and - increasingly - a solid tripartite dialogue. Benefits and donations made directly to community groups during the period in which the mineral activity remains are actions of short or medium term. Other long-term actions should contribute to the socioeconomic sustainability of the mining operation, during and after.

The Ministry of Mines and Energy-MME, through the Secretary of Geology, Mining and Mineral Processing, has, since 2005, been encouraging and promoting the implementation of Agenda 21 and, therefore, within the research line "Mineral Resources and Society" commissioned the Centre for Mineral Technology- CETEM, of the Ministry of Science, Technology and Innovation - MCTI the project titled "Great mines and mineral-based APL's x Local Community", which conducted the case study of ten large mines and five APL's and their effects on communities where they grow. This article shows the results of the case study of the APL of Ornamental Stones of the State of Espirito Santo (APL-ES), carried out between July 2010 and July 2011, by the staff of the Regional Unit of Cachoeiro de Itapemirim of CETEM.

Objective

The objective of this case study was to analyze the social and environmental impacts of the APL of Ornamental Stones of the State of Espirito Santo, identifying the interrelationship between the various stakeholders (mining companies in APL, the government and the local community), raising sustainability indicators specific of the APL and developing a profile of the impacts caused by mining of ornamental stones in society. The paper presented here focusses on the analysis of the perception of the local communities on the impacts of mining.

Methodology

The study included an extensive literature review addressing: case studies of impacts of large mines, concepts and structuring of the APL, reviews on the APL-ES, and social and environmental impacts caused by stone’s quarrying and processing in the region. According to the methodology of the project, the study of the impacts should be conducted in the municipality where the mine lies and in a surrounding municipality in order to compare the benefits of mining activities in mining and adjacent communities. To determine the cities targeted by the study were collected and analyzed data on number of companies, requirements for mineral exploration and environmental licensing,
and socioeconomic data for the municipalities. Were consulted databases of the National Department of Mineral Production-DNPM, the Brazilian Institute of Geography and Statistics-IBGE and the Environmental Agency of the State of Espirito Santo - IEMA.

The ornamental stones industry is spread throughout the whole State of Espirito Santo, but can be considered concentrated in three production poles: the southern region, producing marble and with the largest concentration of processing companies of marble and granite, the northern region which has the largest reserves and in which concentrates granite quarrying, and the central region of the State where there are also quarries and where a pole for processing and export has developed in the region of Vitória (the Capital of the State). For this work we considered the clusters in the north and south, where the production of ornamental stones has greater influence on their economies.

As "mining counties" for this work, Cachoeiro de Itapemirim was elected in the south cluster as it contains the largest industrial facilities concentration for ornamental stones of the country and is a world reference in this sector, and in the northern cluster, the three municipalities around which the quarries concentrate, with greater production of commercial granites: Barra de São Francisco, Nova Venécia and Vila Pavão.

The choice of the surrounding municipalities (non-mining) had the greatest difficulty because of the large number of municipalities with quarries in them. Thus, as the surrounding municipalities were selected those in which, apparently, the production of ornamental stones did not have significant impact on the local economy. In the South, Jerônimo Monteiro was chosen within the Cachoeiro de Itapemirim Micro-region, and in the North, São Domingos do Norte, belonging to the same Macro-region of the mining municipalities selected.

After selection of the counties, two types of questionnaire were prepared: one for the population and one for entities and organizations active in APL. The first, for the local community, was the result of modifications to the questionnaire model for Large Mines, with twenty-one questions, divided into blocks: Identification, consisting of a brief presentation of the respondent; perception / opinion, for the evaluation of public services and changes in quality of life since the early exploitation of ornamental stones in the region, and mining, to identify the respondent's relationship with the mining sector and opinion about the impacts of the activity in the community. The questionnaires addressed to the agencies, organizations, municipalities and companies, were adapted and targeted to the specific activities of these institutions.

The collection of field data consisted of interviews using the questionnaires above mentioned. Interviews with population were made at random, with approaches to residents in several neighborhoods of the cities, seeking to reach a broader perception of the opinion of the inhabitants on mineral exploration. A total of 541 questionnaires were applied: 403 in mining communities (254 in Cachoeiro de Itapemirim, 114 in Barra de São Francisco, 14 in Nova Venécia and 21 in Vila Pavão) and 138 on non-mining communities (88 in Jerônimo Monteiro and 50 in São Domingos do Norte). The interviews with the various entities were made with a prior appointment and visit in a designated place. The main targets were unions (Sindirochas in South, ANPO in North) and employees (Sindimármore), departments of development and environment of local governments and NGOs. Several ornamental stones companies were also interviewed informally. Respondent's answers to the questionnaires were plotted in worksheets and analyzed by comparison between "mining counties" and "non-mining counties". Entities answers were qualitatively analyzed and used to confront or corroborate communities' perception.

Results and discussion

The productive sector more important even today, in almost all municipalities in the State is agricultural, accounting for 30% of GDP and employer of 40% of the active population in the interior. Coffee production and family farms have predominant roles in this production, as well as the emergent agrotourism industry. The other major sectors of the economy of Espirito Santo are iron, steel, oil and gas, cellulose, furniture and costumes.
The State of Espírito Santo stands out in the domestic and international stones' markets, an industrial sector that accounts for 7% of his GDP. It was responsible for a volume of 61.43% of Brazilian exports of ornamental stones, mostly granite trade, which amounted to 2,188,919 tons. In value terms, this share of exports corresponds to 70.88% of total Brazilian exports of ornamental stones, which was of US$ 959.6 million [2]. It has about 2,500 companies, mostly micro and small, that contribute to the generation of 130,000 jobs, 25,000 direct and 105,000 indirect [3].

Commercial production of ornamental stones in the Espírito Santo began in the 50s of the twentieth century, with the extraction of marble blocks, in a rustic manner, and their subsequent transport to Rio de Janeiro and São Paulo, where they were processed. In the 70s of that century also began the production of blocks of granite in the southern region, in Cachoeiro de Itapemirim and other surrounding municipalities, and in northern and central regions, in Nova Venécia and Colatina respectively, with little production. From the 80s, global demand for granite - colored materials with great diversity and higher strength than the marbles - intensified, and the southern region of the State had no outstanding deposits of granites. Thus began the expansion of production activities in the northern state that is characterized for having huge reserves of granite. The production experienced a tremendous growth in the 90s, following the global trend, facilitated by the introduction of diamond wire cutting in granite quarries. The end of the last century and the beginning of this also represented a change for Brazil from being exporter of blocks (raw material) to be exporter of polished slabs (processed material with higher added value). The processing of almost all production of the Espírito Santo State occurs in Cachoeiro de Itapemirim, and increased international demand for Brazilian granite has also led to the consolidation and expansion of the processing industry cluster in the south and the consequent need for companies providing equipment and supplies and providing services to its industrial park, so a metal-mechanic industry for ornamental stones was also developed [4].

The rapid growth of the sector of ornamental stones in the country was affected, in 2008, by the U.S. crisis which gave rise to the international crisis. Exports were hit hard since the North American market was the main destination of Brazilian processed products. This, on one hand, facilitated the growth of internal consumption, but on the other, led to increased exports of raw materials, mainly to China, the country's main competitor. The crisis, of course, had a direct impact on communities of the APL, which experienced a decrease in employment generation and income and poor movement of local businesses. Currently, the rate of production and movement of local economies recovered almost completely and there is a strong tendency of companies to invest not only in technology but also the sustainable development of their activities, showing a maturity, largely gained from the crisis.

Traditionally concentrated in the Cachoeiro de Itapemirim region, in the southern state, today the production of ornamental stones is widespread throughout the State (Figure 1), with different characteristics by region. Most municipalities in Espírito Santo have some kind of activity within the ornamental stones’ industry (in 66 of the 78 municipalities of the State there is some mining activity of natural stones, according to information from the IEMA).

The southern cluster (APL of Cachoeiro de Itapemirim) is centered in the city of Cachoeiro, which has the largest reserves of Brazilian marble and concentrates a large number of companies of all the links in the productive chain and much of the manufactured national production. The growth of APL of Cachoeiro was spontaneous and consolidated by its mining history, without political induction [5]. The cluster includes, beyond Cachoeiro de Itapemirim, another 14 municipalities that are: Vargem Alta, Rio Novo do Sul, Castelo, Atílio Vivácqua, Presidente Kennedy, Mimoso do Sul, Venda Nova do Imigrante, Muqui, Itapemirim, Muniz Freire, Iconha, Guaçuí, Iúna and Alegre.

Figure 1. Estimation of the ornamental stones production in the Espirito Santo State, by municipalities. CETEM/MCTI (2011)
Ornamental Stones Quarries - 2011
Authors’ estimation, from DNPM and IEMA data

GDP per capita
Unit: Brazilian Real
State of Espírito Santo, 2008
Map and Data Source: Brazilian Institute of Geography and Statistics

- Up to 10
- 10-25
- 25-50
- 50-100
- More than 100

6,105.06 to 7,475.73
7,475.74 to 8,480.73
8,480.74 to 10,094.17
10,094.18 to 12,808.36
12,808.37 to 116,844.79

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The northern cluster has great productive potential, especially with regard to the extraction of yellow and green granites. It can be considered that the activities in the northern state actually began in the 80s, although there was little production before. This was due to increased worldwide demand for granite mainly by countries like Italy, Belgium, Switzerland and Japan, making the southern cluster entrepreneurs, technology holders, to seek the production of the North and local entrepreneurs, from other primary activities, to migrate to the production of ornamental stones in search of diversification of activities. The northern cluster has as reference the city of Nova Venécia, which has large production of granite, driven by the creation of an industrial pole by the City Hall in 1995 [5]. However, several other municipalities in the Northwest macro-region have large production of granite. Among these, it can mention: Barra de São Francisco, Vila Pavão, Ecoporanga, São Gabriel da Palha, Água Branca and Água Doce do Norte. In this case, stones’ production is not centralized around one single municipality, as happens in the south, were the mining activities occur around Cachoeiro de Itapemirim. The most important productive area in the north is located within the limits of Nova Venécia, Vila Pavão and Barra de São Francisco. Nova Venécia is considered the center of this northern cluster due to its processing units, although Barra de São Francisco has also several granite processing plants. Vila Pavão, on the other hand, has only quarries, and all the stones produced in her territory are processed in neighboring municipalities or in the southern cluster.

Since 2001, the APL of Ornamental Stones of Cachoeiro has been supported by government policy for APLs, contemplated under the Policy for Industrial Technology and Foreign Trade. Today, although there is a spatial separation and production characteristics, considering the interrelationship and interdependence of the north and south, the cluster of ornamental stones of the Espirito Santo includes the two productive areas.

According to the results of field survey, the socioeconomic indicators of the counties studied have improved in the last 20 years, both the mining and the non-mining ones. For about 80% of respondents in all cities, the quality of life and income improved. The most notable improvements were those of Cachoeiro de Itapemirim and other municipalities in the southern cluster in the last 20 years and of the municipalities of the northern cluster within the last 10 years for almost all indicators. The reduction in inequality, especially between northern and southern state has been remarkable in recent years, coinciding with the stones production expansion in the north, although some studies have identified differences in the degree of development between regions [6]. However, in the last 10 years the reduction in inequality happened in general in the country, which should also be considered. There have been many investments in other activities such as family farming, of great importance to the state.

In fact, the percentage of wealth generation due to public investment increased in the last 10 years in all studied municipalities while the share of wealth creation due to labor declined. The perception of communities about the economic and social improvements in the last 20 years coincides with the official data, as the majority of respondents in all counties agreed. On the other hand, according to the FIRJAN’s municipal development index – IFDM (similar to the HDI of the UNDP, but using different sources and updated annually), from 2000 to 2009, there was a reduction in the rate of employment and income in the municipalities of Nova Venécia and Vila Pavão, as shown in Table 1, which does not coincide with the perception of respondents.

In fact, this decrease took place from 2006 (Figure 2). One reason may have been increased enforcement by the federal agencies, from 2005 due to the high degree of informality, that led to the closure of many quarries. Regarding 2008 and 2009, the international crisis had a greater effect in granites production reduction and thus diminishing employment and income. Anyway, the interviews were conducted in 2011, when production had returned to grow, especially in the north, and was in a new process of expansion with increased processing industries in the region who were creating jobs in production and, indirectly, in the local commerce.

Table 1: FIRJAN Municipal Development Indexes [7]
The community recognizes the importance of mining in generating employment and income and identifies herself with the ornamental stones production, even the surrounding municipalities which proved to be suppliers of manpower for the mining ones. On the other hand, it seems to be the only benefit of stones production in the local communities. There are not social responsibility actions by companies, according to respondents, just some donations, and the communities don’t participate on important decisions for their own future as new quarries opening or processing units’ installation.

The community councils legally established in almost all the counties are also not active in such matters. It was also observed within the interviews that there is a perception of lack of feedback arising from the collection of taxes on mining. It was noticed that the mining communities blame the City Halls of all their problems, as mining was better assessed that public services.
The main negative impacts of mining, in the opinion of the communities of the mining counties, are the generation of dust and accidents, including those due to heavy traffic. The vast majority of respondents in non-mining municipalities (75%) identified no negative impacts. So, much of the population is not aware of stones quarrying and processing real impacts. It was observed in the analysis of the interviews, the low sensitivity of the communities, both mining and non-mining ones, to the negative impacts of mining, such as those caused by the intense traffic of heavy vehicles on the roads causing many accidents and the need for ongoing maintenance, which is held by the State and local governments and not by stones companies.

It is concluded that the APL of ornamental stones of the State of Espírito Santo is extremely important to the local communities due to his great contribution to the generation of employment and income. It was observed, during this work, a boost of the stones cluster in the north, with increased processing industries and an important action of Producer's Association (ANPO) in the pursuit of sustainable development, which should lead to further growth in this region than in other of the state in coming years. The economic impact is so important to the communities that it masks the negative impacts of the stone’s production, which are not noticed by them. However, it is noteworthy that there were large public investments for regional development, which favored the State's economic growth, making difficult the quantitative analysis of the share of contribution generated by the sector of ornamental stones.

Note and acknowledgments

More details of this case-study can be found in the book published, in Portuguese, with all the other case studies of the project [8].

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References


[8]