International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

The Impact of Mining Activities on Regional Development of Pegunungan Bintangregency of Papua Indonesia

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Abstract: ***Pegunungan Bintang Regency is an autonomous region which was formed in 2001 with great potential of natural resources in mining, including coal, oil, and gas. Mineral is a non-renewable natural resource the management of which may pose positive impacts or negative impacts. Therefore, the management of mineral must be done wisely in order to give optimum benefits to the regional development and the people residing in the vicinity of the mine. In connection with the foregoing, the study aimed at analyzing the impact of mining activities on regional development, among others, economic growth, community development, and suitability of space utilization. The analysis results showed that mining activities contributed greatly to regional development, as reflected in the structure of regional economy.***

Keywords: Economic growth; regional development; structure of regional economic.

1. Introduction

The presence of a mining company in an area undoubtedly brings advancement to the surrounding residents. The existence or operation of a mine in an area will bring a more prosperous life, a guaranteed security and a better social life [7]. Such idea is based on the view that a mining company is an agent of socio-economic change for communities in the vicinity of a mine site. The assumption is that a mining company will bring along the flow of investment, dismantle the isolation of citizens, and open the public access to the outside world. With the presence of a mining company, necessary public infrastructure, such as roads, electricity, clean water, transportation, and communication networks will be developed. However, the assumption described above now needs to be changed completely. This is because up to now in various mining sites in Indonesia such assumption never comes true [11]. Within such a framework, one thing that should be emphasized but is often forgotten is a mining company is essentially the embodiment of the world capitalist economic system. Economically, mining activities are able to earn huge profits that bring in foreign exchange and, for relevant regency/city, they can increase the locally-generated revenue (Pendapatan Asli Daerah - PAD) with regard to employer's obligation to pay levies and others [12]. However, the economic advantages obtained are not proportional to the environmental damages caused by mining activities involving exploration and exploitation of natural resources [15]. . According to Fadilah [7], based on the calculation of revenues earned and expenses for existing environmental damages, a comparative value of 0.67 is obtained. This figure shows that the value of annual revenues derived from sand mining activities is very small and not comparable with the total expenses for environmental damages that occurred [10, 15]. In fact, the loss does not include the estimated environmental expenses for erosion, air pollution, expenses for decreasing volume of water and expenses for land reclamation. Land reclamation, which is an activity for recovery of degraded and dead land into productive land, is very expensive in terms of cost, effort and time. It requires a separate time to calculate the cost of land reclamation after mining [13].

2. Review of Literature

2.1. Environmental Impact

[10]. Defines the term "impact" as a change that occurs as a result of an activity. Such activity can be natural, chemical, physical or biological. An impact can be positive in the form of benefit, and can also be negative in the form of risk, to physical and non-physical environments, including socio-cultural. Such activity can be natural, such as bursts of toxic fumes from the crater of a volcano, earthquakes, mass growth of water hyacinth. The activity can also be as a result of human activities, such as construction of chemical industry, dams, opening of paddy fields and others. Environmental impact is an environmental change caused by an activity. Based on this definition, it means that an environmental change that takes place is directly pertaining to the primary environmental component, while an environmental change caused by a change in the condition of the environmental component is not regarded as an environmental impact, rather it is an effect of such change in the environmental component or an indirect result, which is so-called an environmental effect [10]. According to Sudrajat [13]. based on the identifications and experiences, environmental impacts caused by mining industry activities include changes in natural morphology, ecology, hydrology, pollution of water, air and soil [1]. Morphological or landscape changes involve, among others, exploitation activities conducted on hill morphology, involving excavation activities, which eventually turn it into plain, puddles or large pools. The morphological change of becoming large and deep pools will certainly cause changes in ecological and hydrological systems of the area. Pollution of water, air and soil can be caused by dust from excavation activities, dust from crushing or size reduction of ore and waste of

heavy metals and other toxic materials discharged from waste processing and refining [15]. The scope of social aspects at least includes demographic, socio-economic, institutional and psychological and socio-cultural aspects. Demographic impacts include workforce and changes in population structure, employment opportunities, resettlement and relocation of residents. Socio-economic impacts consist of changes in income, business opportunities and employment patterns. Institutional impacts include rising demand for facilities, such as housing, schools, recreational facilities. Psychological and socio-cultural impacts include social integration, social cohesion, residential attachment [2].

Social impacts, according [7], are categorized into two groups: real impacts and perceived impacts. Real or standard impacts are impacts arising from project activities: pre-construction, construction and operation, for example, population resettlement, noise and air pollution. Perceived or special impacts are impacts arising from public perception of project risks. Some examples of such perceived impacts are stress, fear and other forms of concerns. Types of public response can be:

a) Action, such as moving to another place, no longer available to be involved in community activities. This action is taken because the community is not comfortable living in the settlement due to a damaging and polluting project. Action can also be an act against the presence of a project through protests, rallies or demonstrations.
b) Attitudes and opinions that are formed from public perception. The attitudes and opinions are, for example, opinions about their settlement that are no longer comfortable. In short, no more pride to stay at the settlement.
c) Psychological impacts, such as stress, anxiety and others.

2.2. Environmental Damages

Law 32 of 2009 on Environmental Protection and Management states that an environmental damage is a direct and/or indirect change to physical, chemical and/or biological properties of environment that goes beyond the standard criteria of environmental damage. Environmental damage occurs because of an action that causes a direct or indirect change to physical and/or biological properties resulting in the environment to be no longer functioning in support of sustainable development. Environmental damage occurs on land, air and water [8]. Good environmental quality is one of the basic important capitals for the implementation of sustainable development. Environmental quality affects the quality of life of local communities, people working and visiting the area. Many human activities have adverse impacts on environmental quality for poor garbage and waste management, low public awareness on environmental hygiene, increasing use of non-biodegradable materials and other xenobiotic substances with serious impacts on environmental quality. The increasing number and use of private vehicles and unroadworthy vehicles and industrial operations with poor management are other important causes of environmental quality degradation. Spatial and regional planning without regarding the rules of environmental preservation, weaknesses in bureaucracy, law enforcement and institutions are also important factors that affect environmental quality [14].

Degrading environmental quality is an indicator of environmental damage. According to Soemarwoto [10], environmental quality can be interpreted in relation to quality of life, in the sense that in good environment quality there is a potential for development of high quality of life. However, quality of life is subjective and relative. Quality of life can be measured with three criteria:

1) The degree of fulfillment of living needs as a biological creature. These needs are absolute, which are driven by human desire to maintain his/her biological survival.
2) The degree of fulfillment of living needs humanely. These living needs are relative, despite its relation to the first type of living needs.
3) The degree of freedom to choose. In an orderly society, the degree of freedom is certainly restricted by laws, both written and unwritten.

3. Methodology

This research is descriptive explanatory, which aimed at giving an overview on the impact of mining activities in Pegunungan Bintang Regency of Papua. The research variables were four: damages to physical environment (including surface soil condition and vegetation condition), social impacts (including comfort disturbance, land acquisition and employment changes) and environmental management (including determination of mining area, respect for holders of rights over land, licensing aspects, environmental aspects, environmental management approaches from economic, social and cultural aspects and environmental management approaches from institutional aspects). 66 respondents were involved in the research, consisting of 2 respondents from 33 districts taken by purposive sampling.

A questionnaire containing 40 items of Likert-scale questions was used as a measuring instrument. The data analysis used Ward's hierarchical clustering method with SPSS version 20 software.

4. Results

The clustering result of the 33 districts in Pegunungan Bintang Regency employing Ward's method was divided into two clusters. A total of 14 districts belonged to cluster 1, while 19 other districts belonged to cluster 2.

Members of districts in cluster 1 were: Aboy, Awinbon, Bime, Iwur (Okiwur), Jetfa, Kalomdol, Kiwirok Timur, Okbape, Okhika, Oklip, Oksamol, Oksebang, Oksibil dan Pamek. Members of districts in cluster 2 were: Alemsom, Batani, Batom, Borme, Eipumek, Kawor, Kiwirok, Mofinop, Murkim, Nongme, Ok Aom, Okbab, Okbemtau, Okbibab, Oksop, Pepera, Serambakon, Tarup dan Teiraplu.

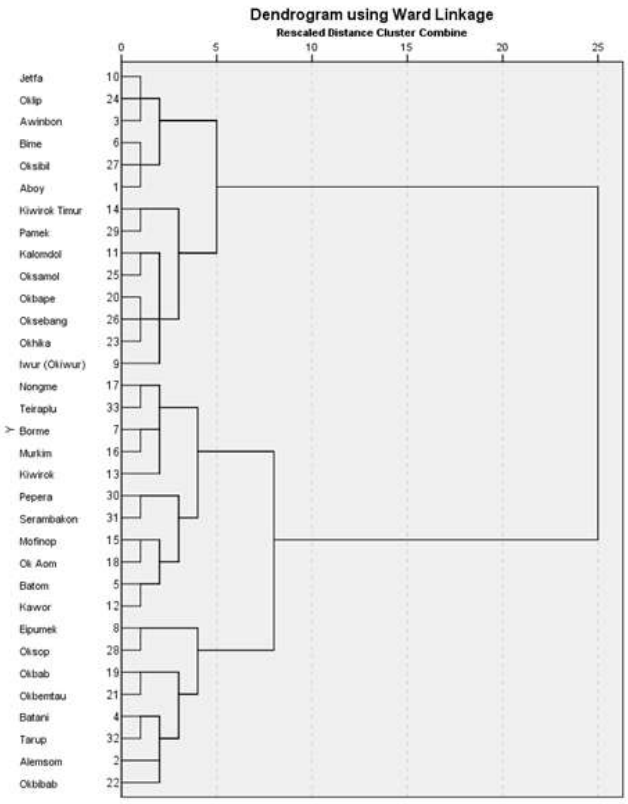

Figure 1: Result of Cluster Analysis

Table 1: Characteristics of Clusters

Description	Label	Average Score	
		Cluster 1	Cluster 2
Surface soil condition	LAND	4.71	4.05
Vegetation condition	VEGETATION	4.S6	3.5S
Comfort disturbance	COMFORTABLE	4.14	2.74
Land acquisition	LAND USE	3.36	2.05
Employment changes	WORK	4.S6	3.26
Determination of mining area	REGION	4.64	3.16
Respect for holders of rights over land	RIGHT	4.50	2.63
Licensing aspects	PERMISSION	3.79	3.00
Environmental aspects	ENVIROMENT	3.29	3.05
Environmental management from economic, social and cultural aspects	SOCIAL EKONOMIC	4.36	3.11
Environmental management from institutional aspects	INSTITUTION	4.57	3.74

Description Label

Average Score Cluster 1 Cluster 2 Surface soil condition TANAH 4.71 4.05 Vegetation condition VEGETASI 4.86 3.58 Comfort disturbance NYAMAN 4.14 2.74 Land acquisition LAHAN 3.36 2.05 Employment changes KERJA 4.86 3.26 Determination of mining area WILAYAH 4.64 3.16 Respect for holders of rights over land HAK 4.50 2.63 Licensing aspects IJIN 3.79 3.00 Environmental aspects LINGKUNGAN 3.29 3.05 Environmental management from economic, social and cultural aspects SOSEK 4.36 3.11 Environmental management from institutional aspects INSTITUSI 4.57 3.74

Mining activities caused some implications from the mining operations conducted in Pegunungan Bintang Regency. The socio-economic implications would be associated with some of the following: work ethic of the community as a basis for increased productivity, participation and social activities, direct or indirect employment, economy and economic behaviors of the community.

In the course of time, certain ethical values, which were unexceptional or mediocre, can be exceptional characters in a particular community or nation, such as discipline, hard work, frugality, and saving behavior. It has implications for public participation in development and social activities. Participation can be defined as a person's conscious involvement in social interaction in specific situations. Based on such definition, one can participate when he/she finds himself/ herself with or in a group, through a process of sharing with others in terms of values, traditions, feelings, loyalty, obedience and mutual responsibilities. Mining may have implications on employment. Generally, Indonesia suffers from a number of fundamental problems of employment. The problems include: first, the general imbalance between the supply of employment and the employment needs. The required amount exceeds the amount that can be provided. The second is the imbalance of structure in employment. The third is the imbalance between the required amount and type of skilled manpower and the supply of skilled manpower. The fourth is the tendency of increasing roles and aspirations of female workforce throughout the structure of Indonesian workforce. The fifth is the inter-regional imbalance in the supply and use of Indonesian workers. Simply put, it can be stated that mining activities have positive impacts on employment.

5. Conclusions

Direct economic potential of coal resources was quite large in view of the large contribution that can be given to the local economy and revenue. Indirect economic potential of mining resources was pretty good given the economic multiplier value. In addition, the mining sector has the highest downstream linkages among other sectors although its upstream linkages are known to be low.

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