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Mineral Fund and Regional Sustainable Development: Case Study of Bombana Regency, Southeast Sulawesi Province

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ABSTRACT

Mineral fund policy is a new paradigm in the sustainable mining practice management. The policy is a part of critics for management failure of mining resource revenue in given prosperity and sustainable environment. Furthermore, the existence of the policy, many countries have been successful in managing their resources and avoid their countries from resource curse syndrome and dutch diseases. Thereof, this research aimed (1) determine estimation of natural resources depreciation as a result of gold mining practice management; and (2) to build mineral fund management scenario in supporting regional sustainable development. Data collecting method was conducted by the focus group discussion (FGD) in world café format. Analyzing data consisted of (i) the estimating natural resources depletion divided in two categories: first, gold mining depletion using economic rent or it can be called as net price and second, total economic value (TEV) through market approach namely that is based on local market price and consumer willingness to pay (WTP); (ii) the mineral fund management scenario in supporting local sustainable development is able to use dynamic system approach. The research results show that: (i) gold mining activities are able to create depletion of natural resources both direct and indirect benefits to the economic; and (ii) the best scenario in consummating the development of mineral fund policy to support sustainable development is optimistic scenario by allocating gold mining fund in two kinds, the mineral fund and its rent value as many as five percent, respectively. Of the amount money, thirty percent is allocated to drive local economic activities and seventy percent is allocated to the environmental aspects that can boost the increasing of environmental parameters and to reduce poverty level in Bombana District, Southeast Sulawesi Province.

INTRODUCTION

Indonesia is a rich country in mining production such as tin, bauxite, nickel, gold and copper, and belongs to ten mining production countries so that mining is being priority of economic investment (Supryadi, 2013). Until 2012, the investment in mining activities give contribution as much as Rp 415.2 trillion or 30.14% of total national income and it has played an important role to poverty reduction where the poverty level in 2009 is 14.15% reduced to be 11.66% in 2012 (Ditjen Minerba, 2012).

Behind the above contributions, the mining activity creates a huge environmental costs. Burke (2006) stated that the characteristic of mining practices in Asia is characterized by poor environmental management. MacMohan *et al.*, (2000) revealed that environmental mitigation cost in Indonesia as resulting from mining practices achieved US\$ 0.5 billion per year. These conditions are enforced by Fauzi (2014) stating that the costs of degraded environment varies in ranged of US\$ 0.56 billion to US\$ 7.7 billion per year which consists of

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kinds degradation such as water salinity, air pollution, and land degradation. This condition is a feature of resource curse syndrome in natural resource management. In other side, mining practices create the dutch disease syndrome which left behind the primary sector tends to the mining sectors (Auty, 2003 and Hampreys, 2007). The impact of this behavior is showing that 70 percent of poverties in Indonesia are in the areas producing minerals, except South and East Kalimantan Provinces (Ditjen Minerba, 2012).

The appearance of resource curse and dutch disease cannot could not be separated of implementing neoclassical economics provident and structural that is pioneered by Robert Solow (Massachusetts Institute of Technology) and Trevor Swan (Australia National University) who has the same point of view, that "capital accumulation, labor, and technology progress are the very crucial components to accelerate development" (Dharmawan, 2010). Those three components are main strength boosters which can trigger the process of structural transformation. Furthermore, the provident assigns resource curse and dutch disease problems such as poverty, income gaps, and environmental pollution, and agricultural marginalization are considered as the second matter, and the very important of the provident is economic growth target (Hutagaol *et al.*, 2009 ; Suryanto, 2009; Stiglitz, 2007). This process relies on the existence of leap development which is previously based on agriculture products towards the development based on industry, mainly extracted mining products.

On other side, resource curse and dutch disease syndromes are caused by the governmental management system of a country which is authoritative and the income management of mining practices is not transparent as public treasury (Ross, 2001; Matthias *et al.*, 2011; Ernst *et al.*, 2012). The research conducting by Matthis *et al.*, (2011) in 120 countries that have mining resources with periodic panel set data 1980-2004, found that countries such as Congo, Angola, Sudan, Zaire, and Sierra Leone are still undergoing resource curse and dutch disease that is impacted by authoritative management and no transparent management of mining income as public treasury. Income of mining activities (taxes and royalties/land rents) are instruments of cash transfer that tends to be failed in prospering community because of bias targets, bias programs, and bias coordination (Muligan *et al.*, 2009).

Looking at the above symptoms, there is a need shift of paradigm in governing regional income of mining sectors as applying by some succeeded countries in mining resources management like Norway, Botswana, Kazakhstan, Azerbaijan and Sao Tome and Principe. Those countries are being success in giving prosper and equity among their generations, now and future. Sachs *et al.*, (2001) and Frankel (2012) stating that those countries make the income from unrenewable resources as the stability fund and strategic investment and it is not used to routine budget of development. The fund is known as Natural Resource Fund (NRF) or the fund for anticipating resource curse and dutch disease that may be appeared. Thereby, the existing of NRF could look after the economic and social stability and even the environment will be sustainable and it would be also fulfilled the current generation needs without subtracting the next generation needs (Yarmon, 2007 and Lucke, 2010).

The appearance of the NRF thought actually is being a critic of neoclassical economics provident that failed in the development process. Usage and managing process of natural resources tends to be failed in giving prosperity to the communities. Monopolistic attitude that is applied by rentiers and furthermore, those rentiers collaborate with stakeholders inflicted 'the role of law' where the law itself to be weakness and even no sense and eventually this collaboration results the economics performance will be getting worse (Stiglitz, 2007).

According to above problems, this research aimed to develop mineral fund policy in supporting regional sustainable development. Specifically, this research proposed (1) to determine estimation of natural resources depreciation as a result of gold mining practice management; and (2) to build mineral fund management scenario in supporting regional sustainable development.

METHODOLOGY

Place and Time of Research

This research was held in Bombana District, Southeast Sulawesi Province. Deciding research location was determined purposively due to the fact that Bombana District is an area in Southeast Sulawesi producing gold. This research was conducted in September 2014 to July 2015.

Data Collecting Method

Data were collected in two forms, primary and secondary. Primary data was collected by focus group discussion (FGD) in world café format that involved multi-stakeholders. Secondary data was collected by tracking data to the related institutions in Bombana District such as local mining offices, local forestry and farm offices, local agriculture and livestock offices, local environmental agency, PT. Panca Logam Makmur, and Regional Statistic Bureau Center (BPS).

Data Analyzing Method

- a. Estimating natural resources depletion divided in two categories: first, the gold mining depletion using economic rent or it can be called as net price of gold mining ($p - c$) where P is gold price production per unit and C is gold cost production per unit, respectively. Second, the economic valuation uses total economic

a. Depletion of Gold Mining

Gold depletion unit value is constructed of abatement gold producing price per unit to gold production cost per unit. The amount of the rent value is shown in the Table 1 below. The table shows that in five years (starts from 2009 until 2013) the depletion average or rent gold mining in Bombana District is as much as Rp 40,688,622,699.17. per year or Rp 141,079.65. per gram per year. This amount should be paid back to the local government that can be used to public interest and environmental recovery as resulted by the extraction. This is related to Setiawati (2012), Fauzi (2011), and Suparmoko (2006) stating that the rent value should be paid back to the local government as an agent which concerns for public interest and to re-stabilize the disturbed natural resources as resulting by mining activities. In relation to exploiting minerals, the rent calculation is never be conducted. This condition happens because natural resources and environment are regarded as national assets and they are not as company assets individually and furthermore the extracted mining company only has a right of exploitation or utilization.

Table 1. Gold Price, Cost and Estimating Unit Rent of Gold Mining (Rp/Gram) in Bombana District, Southeast Sulawesi Province.

Year	Production (Gram)	Price (Rp.000/gram)	Production Cost (Rp.000/gram)	Gross Income (Rp.000/gram)	Worthy Incomet* (Rp.000/gram)	Unit Rent (Rp.000/gram)	Total Gross Revenue (Rp)	Total Worthy Income (Rp)	Total Rent/Depletion (Rp)	Total Rent/Depletion (US\$)
1	2	3	4	5	6	7	8	9	10	
				[3 - 4]	[4 x SBI]	[5 - 6]	[2*5]	[2*6]	[8-9]	[8-9]
2009	118.574	468.887	505.724	(36.837)	35.401	(72.238)	(4.367.926.034)	4.197.614.451	(8.565.540.484)	(719.793)
2010	185.784	474.324	322.735	151.589	22.591	128.998	28.162.840.812	4.197.121.204	23.965.719.609	2.013.926
2011	152.195	475.423	315.300	160.123	22.071	138.052	24.369.904.021	3.359.096.962	21.010.807.059	1.765.614
2012	353.147	475.047	190.125	284.922	13.309	271.614	100.619.381.046	4.699.936.280	95.919.444.766	8.060.458
2013	297.577	445.958	193.444	252.514	13.541	238.973	75.142.198.360	4.029.515.813	71.112.682.547	5.975.856
Total	1.107.277	2.339.639	1.527.328	812.311	106.913	705.398	223.926.398.206	20.483.284.710	203.443.113.496	17.096.060
Rerata	221.455	467.928	305.466	162.462	21.383	141.080	44.785.279.641	4.096.656.942	40.688.622.699	3.419.212

* Worthy income = production cost x interest rate of BI in long run.

Source: Processed from daily cash flow report of Companies X.

Note : US\$ 1 = IDR 11.900 (in year 2014)

b. Degradation of associated resources

Gold mining practices in Bombana District have degraded other resources both direct benefit resources (crops: cocoa, cashew and pepper) and indirect benefit resources (control of land erosion, protector of food cycles, habitats of local floras and faunas, and carbon absorption). Additional impacts are air and water pollution which can be consequent to decrease local community health. The depletion value as result of five years gold mining operating in Bombana approximates Rp 4,899,458,800.00.- or US\$ 411,719.00.- per year. This amount should be paid back to government as does the depletion rent.

Table 2. Estimation of Average Annual Depletion and Total Degraded Environment Resulted by Gold Mining Practices per Five Years.

No.	Depleting Estimation and Degradation	Estimated Value (Rp/Year)	Estimated Value (US\$/Year)
A.	Sub Total Depleting estimation /gold rents	40,688,622,699.00.	3,419,212.00.
B.	Environment Degradation :		
	1. Function impact of environmental economics:		
	a. Direct benefits missing:	3,913,061,224.00.	328,829.00.
	b. Indirect benefits missing:		
	• Erosion control	4,306,500.00.	362.00.
	• Protector of food cycles	264,000,000.00.	22,185.00.
	• Habitats for local floras and faunas	46,200,000.00.	3,882.00.
	• Providing carbons	32,692,296.00	2,747.00.
	2. The impacts of Pollution and interference of Communities Health		
	• Procurement of dug well	181,327,909.00.	15,238.00.

• Ordering water	34,438,206.00.	2,894.00.
3. Interference of Health:		
• Medical expenses	138,834,831.00.	11,667.00.
• loosing income resulted by getting sick	71,853,422.00.	6,038.00.
4. Decreasing Income because of mining practices	212,744,412.00.	17,878.00.
Sub Total Environment Degradation	4,899,458,800.00.	411.719
Total Depreciation of Natural Resources Sub (A + B)	45,588,081,499.00.	3,830,931.00.

Research results show that rent value of gold mining practices since 2009 have been contributing to both total gross regional domestic product (GRDP) and GDRP of mining sectors in Bombana District and also Southeast Sulawesi Province level. The highest rent value of total GRDP have been happened in 2012 in the both levels 7,04 percent and 0,28 percent, respectively. Whilst, the contribution of rent to the mining sector GRDP has happened in 2012 as many as 110,52 percent for Bombana and 3,55 percent for Province level. The value of gross domestic regional product after being reduced by rent of the mining can be reflected the prosperity as resulting of gold mining activities (Table 3).

Table 3 shows that Net Domestic Regional Product (NDRP) both Bombana District and Southeast Sulawesi Province reveals negatively increasing until 2013. This condition can reflect the prosperity or the real end product of gold mining activities. Nevertheless, this condition is not diminished with other production factors. The existence of this NDRP at least is a media to reduce environmental pressures. The characteristics of NDRP are to accommodate environment degradation and natural resources depletion and to correct the weakness of GRDP. Setiawati (2012) and Suryanto (2009) stating that if NRDP is still retained, an anything worried is the economic growth limited and also the decreasing of prosperous index can be postponed.

Tabel 3. Contributing Rent of Gold Mining to GDRP and the mining sector GDRP in Bombana District, Southeast Sulawesi Province in 2009 – 2013 period.

GDP	Tahun				
	2009	2010	2011	2012	2013
Total GDRP Southeast Sulawesi Province (Rp)	25.655.940.660.000	28.376.580.360.000	32.113.037.290.000	36.600.745.690.000	40.773.199.100.000
Total GDRP Southeast Sulawesi Province (US\$)	2.155.961.400	2.384.586.585	2.698.574.562	3.075.692.915	3.426.319.252
Total GDRP Bombana District (Rp)	1.012.401.490.000	1.124.428.550.000	1.256.332.540.000	1.432.204.380.000	1.609.253.650.000
Total GDRP Bombana District (US\$)	85.075.755	94.489.794	105.574.163	120.353.309	135.231.399
GDRP of Mining Sector Southeast Sulawesi Province (Rp)	1.099.235.800.000	1.391.273.250.000	1.948.316.320.000	2.838.450.440.000	3.161.274.350.000
GDRP of Mining Sector Southeast Sulawesi Province (US\$)	92.372.756	116.913.718	163.724.061	238.525.247	265.653.307
GDRP of Mining Sector Bombana District (Rp)	42.631.700.000	62.593.430.000	66.302.670.000	91.223.010.000	120.598.160.000
GDRP of Mining Sector Bombana District (US\$)	3.582.496	5.259.952	5.571.653	7.665.799	10.134.299
Depletion/Rent of gold mine (Rp)	(8.565.540.484)	23.965.719.609	21.010.807.059	95.919.444.766	71.112.682.547
Depletion/Rent of gold mine (US\$)	(719.793)	2.013.926	1.765.614	8.060.458	5.975.856
Natural resource depletion as a result of gold mining (Rp)	4.899.458.800	4.899.458.800	4.899.458.800	4.899.458.800	4.899.458.800
Natural resource depletion as a result of gold mining (US\$)	411.719	411.719	411.719	411.719	411.719
Total Depreciation of Natural Resources (Rp)	(13.464.999.284)	28.865.178.409	25.910.265.859	100.818.903.566	76.012.141.347
Total Depreciation of Natural Resources (US\$)	(1.131.513)	2.425.645	2.177.333	8.472.177	6.387.575
NDRP Southeast Sulawesi Province (Rp)	25.642.475.660.716	28.347.715.181.591	32.087.127.024.141	36.499.926.786.434	40.697.186.958.653
NDRP Southeast Sulawesi Province (US\$)	2.154.829.887	2.382.160.940	2.696.397.229	3.067.220.738	3.419.931.677
NDRP Bombana District (Rp)	1.025.866.489.284	1.095.563.371.591	1.230.422.274.141	1.331.385.476.434	1.533.241.508.653
NDRP Bombana District (US\$)	86.207.268	92.064.149	103.396.830	111.881.132	128.843.824
Percentage rent gold mines to Total GDRP Southeast Sulawesi Province	0,01	0,10	0,08	0,28	0,19
Percentage rent gold mines to Total GDRP Bombana District	0,36	2,57	2,06	7,04	4,72
Percentage rent gold mines to GDRP of Mining Sector Southeast Sulawesi Province	0,33	2,07	1,33	3,55	2,40
Percentage rent gold mines to GDRP of Mining Sector Bombana District	8,60	46,12	39,08	110,52	63,03

Remarks : US\$ 1 = IDR 11.900 (in year 2014)

Mineral Fund Management Scenario in Supporting Regional Sustainable Development at Bombana District, Southeast Sulawesi Province.

Resulting formulation of focus group discussion (FGD) shows that the priority program in supporting regional sustainable development in Bombana are economic growth, poverty reduction and environmental quality enhancement. These three variables are a part of sustainable mining practices. This result is accordingly stated by Muligan (2009); ICMM (2012) stating that the mining practice can be sustainability if there are economic growth, poverty reduction and environmental stability. In exceeding sustainable development of the area, the mineral fund management can use three scenario models, as described below.

a. Pessimistic Scenario

On the pessimistic scenario model, it is actually like the existing condition right now. According to analyzing result by using dynamic system that the development of mineral fund in Bombana Regency is still continuing to rise until the set limit which is 2017. The progress of the mineral fund is determined by selling price level and production cost of each year and also the long run bank interest. The progress of mineral fund, mineral rent and poverty reduction are presented in Fig.2 and Fig.3.

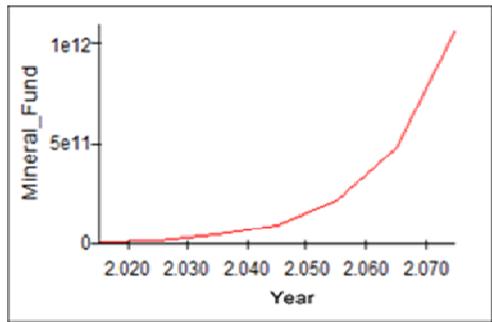


Fig 2. Pessimistic Scenario of Progressing Mineral Fund 2015-2070

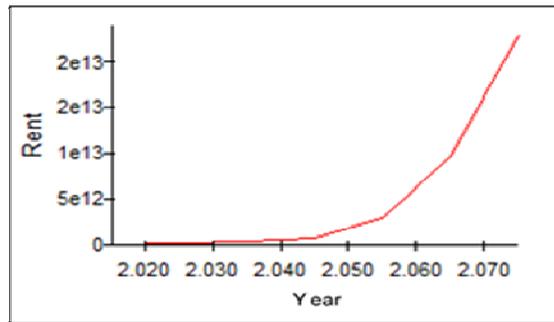


Fig 3. Progressing Mineral Rent 2015- 2070

In this pessimistic scenario model, the role of mineral fund as a routine budget of local development such as other incomes. This scenario is very paradox to environmental quality. Fig. 4 & 5 illustrates the paradox between poverty and environment. In the year of 2070, the district will diminish environmental services as much as US\$ 340,222,202.00. as result of gold mining activities, and it is greater when compared to the resulted GDRP that is only US\$ 27,313,483.00. Fig.4 shows that the mining practices in Bombana District areas actually do not give any contribution to GDRP of mining, it can be seen by its environment which getting worse.

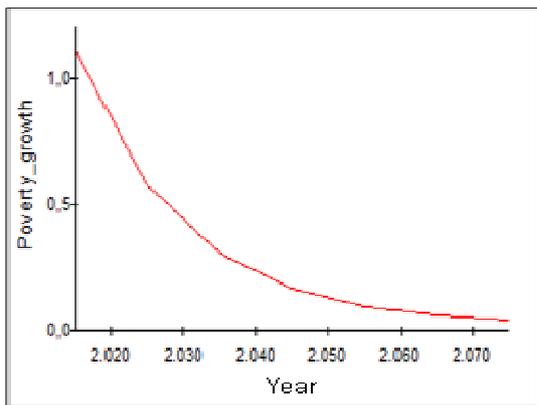


Fig 4. Pessimistic Scenario of Poverty Growth 2015-2070

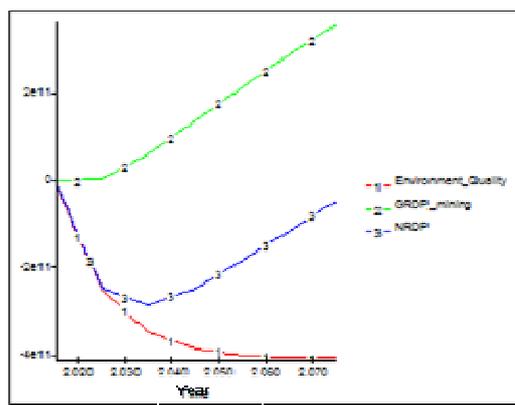


Fig 5. Pessimistic Scenario of Pressing Environmental Quality, GRDP of Gold Mining and NRDP 2015-2070

b. Moderate Scenario

Moderate scenario, assuming that the mineral fund is managed separately by a multi-institution and it is not used as a routine budget for local development but it is invested to strategic investment as the generation fund which produce interest such as deposited the fund as savings in banks. In other situation it can be used as supplement fund development (solidarity) (Sachs *et al.* 2001 and Frankel 2012). This running scenario uses assumption that the long run bank rate as many as 7 percent. Until 2015, the total gained mineral fund as much

as US\$ 1,053,680.00. The amount money, all of it will be deposits as saving. Five percent of the fund's interest deposits will gain as much as US\$ 52,684.00. From the interest'money, 70% is allocated to restore the environment condition and the rest is allocated to instrategic investment (Fig. 6 and Fig. 7).

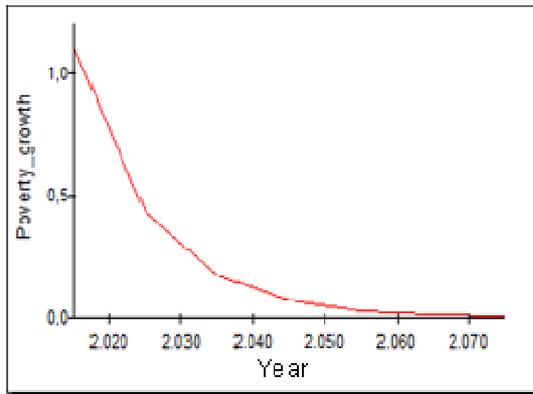


Fig6. Moderate Scenario of Poverty Reduction in Bombana (2015- 2070)

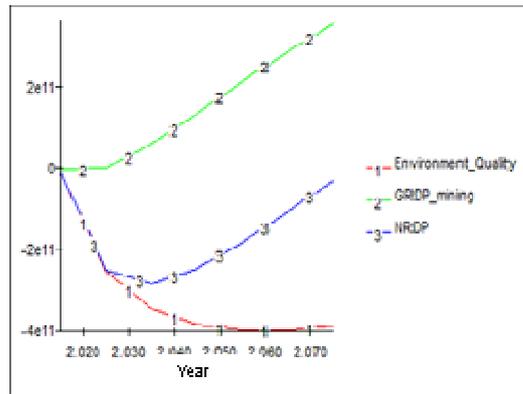


Fig7. Moderate Scenario of Progressing Environmental Quality, GRDP of Gold Mining and NRDP (2015-2070)

c. Optimistic Scenario

By taking the second scenario (moderate) the poverty is getting relatively low and environmental quality is getting relatively low. The optimistic scenario is run as the moderate but there is additional fund that gained from mineral rent which is as many as 5 percent of total rent (Table 1) namely US\$ 2,964,-. Sum of both money is US\$ 55,648.00. Total of the sum money, 70 percent is allocated to restore the environment and the rest is allocated to develop local economic growth. The scenario results there is a decreasing of environmental is getting low which is meant positively to enviroental quality, look at graphic at Fig. 8 and Fig. 9. By seeing about Fig.9, there is an intercept between GRDP and NRDP at year 2065. This means that the environmental condition is restored like before the mining company operating. Furthermore, the next years the environmental condition is getting better and NRDP is getting high. This condition illustrates that the green economy is achieved.

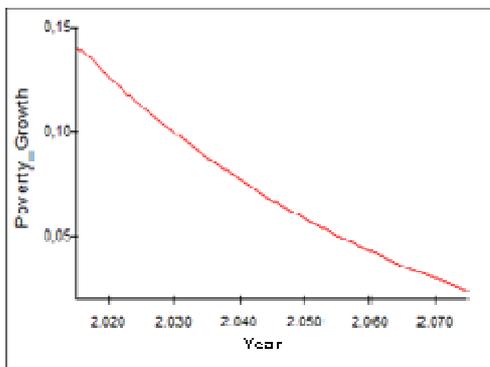


Fig8. Optimistic Scenario: Poverty Growth of Bombana Regency (2015- 2070)

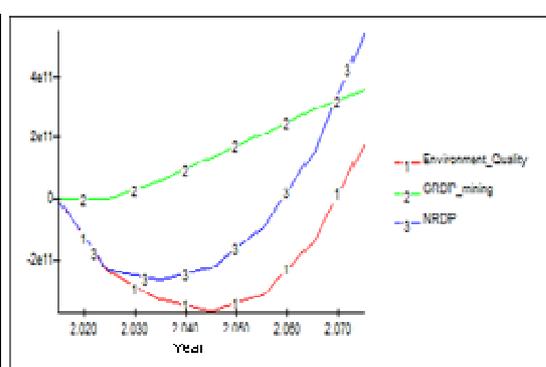


Fig9. Optimistic Scenario of Environmental Quality, GDRP of Gold Mining and NRDP of Bombana 2015- 2070

Conclusion and Recommendation

Conclusion

1. Mining activities can create natural resources depletion but bringin both direct benefits and indirect benefits to the economic;
2. The best scenario for exteriorizing the development of mineral fund policy in supporting local sustainable development is the optimistic scenario which allocates the mineral fund and it rent of each as many as 5%. Of total the fund, 30% is allocated to drive local economy and the last is aimed to restore the environmental aspects in order to enhance the increasing of environmental quality and to decrease local poverty level in the Bombana District.

Recommendation

In achieving green economy, the Bombana government should define the local regulation about mineral fund and allocate mineral rent as many as 5 percent of it amount annually. This fund would have a great result if it is organized by an independent institution that is controlled by the local government.

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