



Figure 1. Mangrove swamp in Polique bay overlooking Mt. Mayon with mine spoils from the Legazpi Perlite Project.  
Photo by: EE Torres (2015)

# DO WE GET FAIR SHARE FROM PERLITE MINING?

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**Background.** Bicol Region is one of the country's regions with rich mineral reserves. The abundance of volcanic mineral deposits in Bicol Region is mainly due to its unique geological setting that is characterized by the presence of a number of volcanoes in the mainland. When tapped, these mineral resources would have immense economic potential to boost development in the region. According to the Mines and Geosciences Bureau V, there are 2 patented mining claims, 29 MPSA Contracts, 3 Joint Operating Agreements, 3 mining lease contracts, 12 exploration permits issued, 54 MPSA applications, 94 Exploration Permit Applications as of June 30, 2015<sup>1</sup>. The value of metallic and non-metallic minerals in the 3<sup>rd</sup> Quarter of 2014 amounts to PhP2.4B<sup>2</sup>. Metallic minerals in the region accounts for 99.68% of the value which include gold and silver from Masbate while non-metallic minerals accounts for 0.32% which is composed primarily of perlite from Albay.

Sixty-nine percent of the perlite reserve in the region can be found in Baao, Camarines Sur and the remaining reserves can be found in Legazpi City<sup>3</sup>. The active perlite mines in the region are being operated by UBS Marketing Corporation (276.23 has) in Legazpi City and OrophilStonecraft, Inc. (205.27 has) in Baao and Iriga City in Camarines Sur.

**Capital Investment.** The total capital investment of UBS Marketing Corporation to the Legazpi Perlite Project is approximately PhP15 million<sup>4</sup>. This includes present value in 2003 of the project's acquisition cost from Trinity Lodge Mining Corporation amounting to PhP1million in 1986.

**Social Development and Management Program.** The total cost of the Social Development and Management Programs of UBS Marketing Corporation from 2004 to 2015 reached approximately PhP4.7 million. The social development assistance focused only on infrastructure development and/or provision of equipment, e.g, establishment of health facilities, multi-purpose halls and pavements, streetlights, basketball courts and computer for schools. No support activities were given to promote human resource development and institutional building, enterprise development and networking, and in the development of Mining Technology and Geosciences programs. At present, the public is not allowed to enter the premises of the mine sites without the permission of the mining company to see how the mining project operates nor the records of the Multi-partite Monitoring Team (MMT) readily available for verification by the public.

**Tax revenue.** Only PhP22,529.08 annually is gained by the city government of Legazpi in operating the perlite mine. This amount represents the real property tax and special education fund (SEF) amounting to PhP1,829.08 and the full occupation fee amounting to PhP20,700.00 (RA 7942). Corporate income tax, excise tax, value-added tax, and capital gains tax are credited to the national government and are collected in Quezon City where the company is located.

**Environmental and health impacts.** The land area covered by the approved MPSA of UBS Marketing Corporation is an active agricultural land particularly for coconut production. As a result of mining, the estimated value to replace nitrogen, phosphorus, and potassium of the removed topsoil is PhP49,911.04

annually. In addition to the removed topsoil, the natural erosion in the MPSA was estimated to be PhP562,881.87 in 2014 based on the dredging cost of eroded topsoil.

The eroded soil causes sedimentation in the intertidal area as well as in the 376.69-hectare coral reef in PoliQUI bay. The estimated annual reduction in value of the coastal and marine habitats amounts to PhP36,426.98 for coral reefs, PhP2,678.13 for seagrass beds, and PhP16,725.12 for mangrove swamps. The sediments discharged to the bodies of water also reduced the value of fish caught by the fishers in the area by an amount of PhP345,120.00 because they have to fish farther than they used to do.

The main agricultural enterprise affected by the operation of the Legazpi Perlite Project is the coconut plantation. Taking into account the annual expansion of the mine pits, the estimated value of coconut trees lost is PhP363,000.00 annually. The value of the forest in the mine site is based on the value of the carbon sequestration capacity of the *Imperata* grassland which amounts to PhP33,962.33 in 2014.

In terms of health, 5.0% of the residents had upper respiratory tract infection/ acute respiratory infection, and 1.6% of the residents had pneumonia in 2014. Assuming that 50% of the incidence of morbidity are caused by dust from the perlite mine site and stock pile, the estimated cost of treatment and income lost due to sickness in 2014 was estimated to be PhP281,844.01.

Tourism is also affected by the perlite mining project because the coastal areas in the barangays have strong potential for beach tourism and possible for snorkeling and scuba diving. However, this cannot be realized because of the mine spoils or sediments discharged from the mine site and other land development activities. Considering the development of Legazpi Boulevard as part of the proposed GUICADALE road and assuming that the project will be completed by 2018, the potential reduction from tourism revenue was estimated to be PhP2,598,218.38 in nominal terms in 2018 alone.

**Poverty.** For more than 40 years of perlite mining operation in Lamba and Maslog, Legazpi City, these two barangays remained to be among the most



Figure 2. Mine sites and stock pile for perlite and waste dump of Legazpi Perlite Project, Legazpi City.  
Source: Goggle Earth (2014)

depressed areas in the city. The proportion of households with income below the poverty threshold in Lamba and Maslog stands at 45.4% and 57.7% based on the CBMS of Legazpi City in 2009 to 2011 which are close to the 48.6% average of the city in the same period<sup>5</sup>. The employment opportunity provided by the mining company is limited to those who have the capability to operate heavy equipment. Considering that there are 1,200 households in the two barangays, the employment generated by the company is only 18 workers.

**Monetized benefits and costs.** The advantages of mining activities are often shown in terms of its contribution to the gross domestic product, employment, taxes, and social development programs. However, the impacts of the mining activities to the biophysical and social environment where the mining activity is located should not be discounted. From the stand point of sustainability, this is risky since many mining activities could irreversibly decimate the life support system of nature (the biophysical component) and severe the social systems that would ensure order among communities. A common measure to be able to compare the benefits and costs of a mining project is to convert the impacts in monetary terms among the sectors affected by the activity.

The estimated net present value of benefits of UBS Marketing Corporation from raw perlite extraction was estimated to be PhP2.25Million from 2003 to 2027. This is net of the capital investments of the company amounting to PhP13.63 Million and taxes amounting to

Table 1. Net present value of benefits and costs of perlite mining by sector at 10% discount rate, Philippines: 2003-2027.

Sector	Benefits		Costs		Net Benefits	Per Capita (25 years)
	Components	Value	Components	Value		
UBS Marketing Corporation	Net Income <sup>6</sup>	17,998,439	Investment <sup>12</sup>	13,632,355	2,261,715	2,261,715
Legazpi City (195,896) <sup>a</sup>	Employment <sup>7</sup>	17,399,006	Taxes <sup>13</sup>	2,104,369	3,763,494	19.21
	SDMP <sup>8</sup>	3,214,015	Agriculture <sup>14</sup>	3,294,966		
	SDMP Multiplier <sup>9</sup>	32,431	Coastal and Marine <sup>15</sup>	506,773		
	Occupation fee, real property tax, SEF <sup>10</sup>	204,497	Forest <sup>16</sup>	264,600		
			Health <sup>17</sup>	2,163,673		
		Soil erosion <sup>18</sup>	5,578,235			
		Tourism <sup>19</sup>	5,278,209			
National Government (102,965,300) <sup>b</sup>	Excise taxes <sup>11</sup>	1,899,872			1,899,871	0.018
Option Value			Option value <sup>20</sup>	80,013,209.52	(80,013,210)	
<b>TOTAL</b>		<b>40,748,260</b>		<b>112,836,389</b>	<b>(72,088,129)</b>	

<sup>a</sup>NCSB. n.d. Retrieved from <<http://www.nscb.gov.ph/activestats/psgc/municipality.asp?muncode=050506000&regcode=05&provcode=05>>.

Projected based on population growth rate of 1.46%.

<sup>b</sup>NCSB. n.d. Population Projections. Retrieved from <[http://www.nscb.gov.ph/secstat/d\\_popnProj.asp](http://www.nscb.gov.ph/secstat/d_popnProj.asp)>.

Php2.10 Million for the same period. The benefits derived by the residents of Legazpi City include the net present value of employment generated by the company for the 18 machine operators (Php17.40 Million), SDMP (Php3.21 Million), multiplier effect of the SDMP (Php32,431), and occupation fee, real property tax and special education fund (Php204,497.00). These are the benefits obtained by the residents at the expense of negative environmental and health impacts of mining which include Php3.29 Million for agriculture, Php506,773.00 for coastal and marine resources, Php264,600.00 for the forestry sector, Php2.16 Million for health sector, Php5.58 for soil erosion, Php5.28 Million for tourism.

The estimated net benefit was estimated to be Php3.76 Million or equivalent to Php19.21 for every resident of Legazpi City for a period of 25 years of mining activity. With labor participation rate of 62.6% (PSA as cited by NEDA V, 2015) in the Bicol region, the company's contribution to employment is 0.015% of the 122,631 labor force. The national government benefited from the excise tax with a net present value of Php1.90 Million. This excludes the value added tax and corporate tax paid by the company in Quezon City. Considering the opportunity cost of the MPSA area as a potential residential area, the over-all net present value of the perlite mining project was estimated to be negative Php72.09 Million.

**Policy Directions.** Mining should be pro-people and pro-environment in sustaining wealth creation and improved quality of life. With the above findings that Legazpi City, particularly the direct impact barangays of Lamba and Maslog, does not get a fair share of its natural endowment the following policy options are forwarded:

1. Temporarily stop the issuance of MPSA until the full cost of environmental impacts is considered in the assessment of the proposed projects.
2. Incorporate in the Environmental Protection and Enhancement Program (EPEP) the rehabilitation of coastal and marine habitats.
3. The current Social Development and Management Programs (SDMP) do not address the issues of development in the community and should be thoroughly reviewed in cases of mining applications.
4. Review tax policies to address unequitable sharing of tax revenue in favor of Local Government Units where mining is located.
5. Land use planning should incorporate monetized environmental impacts of proposed land used for a well-informed decision-making.
6. Integrate mitigation measures of environmental impacts of mining activities in the tourism development plan particularly in ALMASOR.

## NOTES:

1. Mines and Geosciences Bureau. 24 June 2015. Mining Industry Statistics.
2. National Economic Development Authority Region V. 2014. Bicol Development Update. Vol. IX No. 3, September 2014.
3. Mines and Geosciences Bureau. n.d. Mineral Resources of Bicol Region. Available at <<http://www.mgb.gov.ph/MGBV/MINERAL-AL.PDF>>.
4. UBS Marketing Corporation. 2012. Environmental Protection and Enhancement Program. DENR-MGB.
5. Community-based Monitoring System International Network. 2011. The Many Faces of Poverty in Legazpi City.
6. Based on 25% of sales value as reflected in the summarized monthly project update report (MGB V). The values are deflated to 2014 prices.
7. Based on direct employment (Summarized monthly project update) valued at annual minimum wage for non-agriculture. The values are deflated to 2014 prices.
8. Based on UBS 5-year SDMP plan and MGB SDMP monitoring and financial reports. The values are deflated to 2014 prices.
9. Based on 1% of annual SDMP budget and 1% of previous year's multiplier effect.
10. Real property tax (Legazpi City Treasurer), special education fund (Legazpi City Treasurer), and occupation fee (PhP75.00 per hectare MPSA) deflated to 2014 prices.
11. Approximately 2% of sales value as reported in the monthly project update report of UBS Marketing Corp. to the DENR-MGB.
12. Mine pit development, mine equipment acquisition, building construction, office supplies, pre-operating expenses, and PhP1,000,000.00 in 1986 compounded to 2003 at 10% discount rate.
13. Includes excise tax (MGB V), real property tax (Legazpi City Treasurer), special education fund (Legazpi City Treasurer), and occupation fee (PhP75.00 per hectare MPSA) deflated to 2014 prices.
14. Based on annual returns from 24 coconut trees (10 meters X 10 meters planting distance) cut down every year in 0.24 hectares. Annual value of mature coconut tree (producing 44 nuts with 11 kgs copra per year @P25/kg and with productive years of 25) in 2014 is P15,125.00 (PCA Zamboanga).
15. Value of corals, seagrass and mangroves providing fisheries, carbon sequestration, coastal protection, biodiversity, erosion protection, and nursery. Estimated annual fish production is based on average biomass of target species of 5 tons/km<sup>2</sup>/yr and fish production/biomass ratio of 1.5 for coral reef fishes, at an average of ex-vessel price of PhP500.00/kg, and production costs estimated at 20% of gross revenue (Samonte-Tan and Armedilla 2004). Carbon sequestration is based on 10% of 9 tonnes-carbon/ha/yr productivity of coral reefs (Whittaker and Likens, 1973 by Samonte-Tan and Armedilla 2004). Based on \$20/tonne-carbon of avoided future cost of climate change (Fankhauser, 1994 by Samonte-Tan and Armedilla 2004). Coastal protection is based on US\$5,000/km<sup>2</sup>/year (White et. al, 2000 by Samonte-Tan and Armedilla 2004). Biodiversity of coral reef is based on US\$15/ha/year (Sasekumar et al, 1998 as cited by Samonte-Tan and Armedilla 2004) or PhP 82,500/km<sup>2</sup>/year. Biodiversity of mangrove is based on \$15/ha/year based on cost-benefit analysis of mangroves in Bintuni Bay, Indonesia (Ruitenbeek, 1992 by Samonte-Tan and Armedilla 2004). Annual net revenue of fisheries in seagrass meadows is based on USD72/ha/year (Samonte-Tan, et.al. 2007). Nursery and habitat role estimated at 25% of fish landings. This is a conservative assumption based on 50% fish catch landings attributed to mangrove nursery role for fish and shrimps (Sasekumar et al., 1998 by Samonte-Tan and Armedilla 2004).
16. Based on above ground biomass of 8.5 Mg Carbon/ha by Lasco, et.al. (1999) as cited by Lasco and Pulhin (2009). Based on annual mined out area of 0.24 hectares per year from 1990 to 2015 and projected until 2027. USD15/MT Carbon @ PhP47/USD in 2009 (Magat, S. 2009).
17. Based on 5% morbidity caused by URTI / ARI in Legazpi City in 2014. Assumed 5% of projected population of Lamba and Maslog had URTI/ARI with treatment cost of PhP896/person treatment cost for outpatients (FIES 2012). Lost income is assumed to be equivalent to 2 days of work at PhP260/ day wage due to URTI / ARI for treatment. 50% of treatment cost and lost income is attributed to perlite mining.
18. Based on the value of nutrients (Nitrogen, phosphorus, and potassium) to be replaced when the overburden is removed with a depth of 0.20 meters (i.e. plow area) per year. Including the dredging cost of natural erosion (32.06 tons/ha/year) in the 276 hectares MPSA at PhP64.24/MT (DPWH Zambales and Orani Builders and Supplies).
19. Based on projected net revenue of tourist. Two percent of the projected population will visit the site (coastal area) for 2 hours starting in 2018 when the Legazpi boulevard is extended to barangays Lamba and Maslog to connect Legazpi City to the municipality of Manito. Tourist expenditure of domestic tourists is PhP1,500/day and foreign tourists at PhP4,000.00/day.
20. Based on zonal value of regular residential lot amounting to PhP500/sqm for 20% of MPSA area sold in 2015.

Appendix A. Summary of costs and benefits (in PHP '000) of Legazpi Perlite Project, Legazpi City: 2003 to 2027.

Year	Costs									Total Costs	Benefits					Total Benefits	Net Benefits
	Agri	CMR	Forests	Health	Tourism	Soil Erosion	Investment	Option Value	Taxes		Net income	Employment	SDMP	Taxes	SDMP Multiplier Effect		
2003	363	56	19	171	-	618	14,996	-	1,113	17,335	211	142	-	1,113	-	1,465	(15,870)
2004	363	56	20	182	-	618	-	-	38	1,276	242	1,716	-	38	-	1,996	720
2005	363	56	22	193	-	617	-	-	36	1,287	893	1,676	157	36	2	2,764	1,477
2006	363	56	23	203	-	617	-	-	113	1,375	1,273	4,676	457	113	5	6,524	5,149
2007	363	56	24	212	-	616	-	-	169	1,440	2,677	3,995	457	169	5	7,302	5,862
2008	363	56	26	224	-	616	-	-	119	1,404	1,217	3,970	457	119	5	5,768	4,365
2009	363	56	27	231	-	615	-	-	88	1,380	613	2,389	457	88	5	3,552	2,171
2010	363	56	29	242	-	615	-	-	100	1,404	810	1,475	457	100	5	2,847	1,443
2011	363	56	30	250	-	614	-	-	102	1,415	835	1,423	404	102	4	2,768	1,352
2012	363	56	31	261	-	614	-	-	103	1,428	1,093	1,361	350	103	4	2,910	1,482
2013	363	56	33	270	-	613	-	-	199	1,533	1,907	1,271	463	199	5	3,844	2,312
2014	363	56	34	282	-	613	-	-	209	1,557	2,207	1,236	514	209	5	4,171	2,614
2015	363	56	35	286	-	612	-	276,227	209	277,789	4,015	1,236	514	209	5	5,978	(271,811)
2016	363	56	37	290	-	612	-	-	209	1,567	4,185	1,236	514	209	5	6,148	4,582
2017	363	56	38	294	-	611	-	-	209	1,572	4,355	1,236	514	209	5	6,319	4,747
2018	363	56	39	299	2,598	611	-	-	209	4,175	4,525	1,236	514	209	5	6,489	2,314
2019	363	56	41	303	2,864	610	-	-	209	4,446	4,695	1,236	514	209	5	6,659	2,213
2020	363	56	42	307	3,130	610	-	-	209	4,717	4,866	1,236	514	209	5	6,829	2,112
2021	363	56	43	312	3,395	609	-	-	209	4,988	5,036	1,236	514	209	5	7,000	2,011
2022	363	56	45	316	3,661	609	-	-	209	5,260	5,206	1,236	514	209	5	7,170	1,910
2023	363	56	46	321	3,927	608	-	-	209	5,531	5,376	1,236	514	209	5	7,340	1,809
2024	363	56	48	326	4,193	608	-	-	209	5,802	5,547	1,236	514	209	5	7,510	1,708
2025	363	56	49	331	4,458	607	-	-	209	6,074	5,717	1,236	514	209	5	7,681	1,607
2026	363	56	50	335	4,724	607	-	-	209	6,345	5,867	1,236	514	209	5	7,831	1,486
2027	363	56	52	340	4,990	606	-	-	209	6,617	5,867	1,236	514	209	5	7,831	1,214
<b>Total</b>	<b>9,075</b>	<b>1,396</b>	<b>883</b>	<b>6,782</b>	<b>37,941</b>	<b>15,307</b>	<b>14,996</b>	<b>276,227</b>	<b>5,111</b>	<b>367,718</b>	<b>79,236</b>	<b>41,390</b>	<b>10,848</b>	<b>5,111</b>	<b>110</b>	<b>136,695</b>	<b>(231,023)</b>
<b>NPV dr=10%</b>	<b>3,295</b>	<b>507</b>	<b>265</b>	<b>2,164</b>	<b>5,278</b>	<b>5,578</b>	<b>13,632</b>	<b>80,013</b>	<b>2,104</b>	<b>112,836</b>	<b>17,998</b>	<b>17,399</b>	<b>3,214</b>	<b>2,104</b>	<b>32</b>	<b>40,748</b>	<b>(72,088)</b>

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