



## **Effects Of Marble Exploration On Physical Development Of Igbeti Community In Oyo State, Nigeria**

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***Abstract:***

*This paper investigates the effects of mining activities on physical development of Igbeti, Nigeria. Field survey was conducted in the mining sites as well as in the town via the use of questionnaire and interview to elicit information on the negative effects of mining on the host community. The identified environmental and physical problems include devastated land, air, noise pollution and vibration. Another major problem identified was that of lack of unity in the community, which is adversely affecting physical development of the town. The paper therefore recommends that physical planning strategies such as preparation of development plan for the town and resettlement scheme for those whose buildings were adversely affected by mining activities. Since implementation is a pivot to success of any good plan and policy, it is recommended that various government agencies, corporate bodies and the public should be involved in the exercise.*

***Keywords:*** *Development-plan, exploration, pollution, physical-planning, resettlement-scheme, vibration and solid-minerals.*

**Introduction**

The role of mineral exploitation to the economic development of Nigeria cannot be over-emphasized. During the colonial rule, the economy was controlled by the colonial masters who only relied on the production of raw materials to feed the industries in Europe. Mineral exploitation was though second to agriculture yet remained a major contributor to employment and revenue generation to the colonial government. Minerals exploitation is not only reliable source of economic improvement but also a tool for building national strength, standardized physical development and international politics. This contributed to the Gross Domestic Product (GDP), source of fuel and energy for transportation and domestic purpose. This was prior to the discovery of oil in Nigeria. Records by the Central Bank of Nigeria shows that solid minerals contributed 18% to GDP in 1973/74, and 70% of total fuel and energy needed in the country. The value of general export rose from N 10 million in 1950 to N 5,392.2 million in 1974 (CBN, 1976) With the discovery of oil and natural gas in Nigeria, solid minerals exploitation had virtually collapsed. Efforts in the past to put solid minerals exploitation sector on a new pedestal proved abortive. Nevertheless solid mineral is witnessing some positive growth in recent years. This improvement led the Federal Government of Nigeria (FGN) to declare 2007 as a year of Mines and Minerals in an effort to uplift the solid mineral sector to complement the oil sector. Currently, the country recorded 34 solid minerals as documented in 2010 (see table 1). However, many are yet to be discovered in Nigeria (Dung-Gwom, 2007 and Federal Ministry of Solid Minerals Development, 2010). Since physical planning is aimed at spatial ordering of land use for the purpose of creating conducive environment (Keeble, 1969). The crucial challenges to land use planner about solid mineral exploitation are its effects on physical planning and the general environment where the product is being exploited. It is therefore necessary for planning agencies to translate this aim into specific land uses and standards. This involves devising set of regulations, code and other specification to control the physical setting of human settlement in areas where the minerals is being exploited in other to ensure safety, health, amenity, welfare, convenience, efficiency and public interest (Tej, 2004) As the scales of exploitation of solid mineral increases, its negative impact become more visible (Odeyemi, 2007). There is therefore an urgent need to limit these negative impacts to management proportion for sustainable development. This approach therefore anchors on physical planning for stimulating of appropriate action to make lives better in the mining area.

Exploitation of solid minerals has been considered as a paradigm of wealth but its marketing conceals its terrible social and environmental consequences (Fornseca, 2004). The negative impact of mineral exploitation is inevitable; therefore there is call for the need to limit it to manageable proportion for a sustainable development. Sustainable development has remained exclusive for many African countries especially where most countries in the region have not being fully realized the opportunities of globalization (Robertson, 2010). There is need therefore to progress on areas such as biodiversity, biotechnology, energy, water, desertification which are the consequences of natural resources exploitation (African Ministerial Council on Water 2012)

Development embraces more than economic growth. It is multi-dimensional phenomenon that centres on man's well being. Mabogunje (1990) conceptualise that development process is increase in the output of economic activities in which exploitation of solid minerals is inclusive rather than human welfare. In socio-economic context, development implies modernization, which is a process whereby a society is re-oriented in its structure, institutions, value and pattern of behaviour towards globalization. This implies the integration of economic, political and socio-cultural changes across the border (Wiki Answer, 2011).

The question that comes to the minds of many researchers and academicians is that; how can the world synchronize the long term economic well being and sustainable management of natural resources and reduction in environmental degradation (Sinkala 2009). A new approach in resources management has been devised to answer such question. The approach was derived from environmental preservation, conservation and anchors on the adoption of physical planning. It is the conservation and the planned management of a natural resource of the total environment in a particular ecosystem that prevents exploitation, pollution, destruction and neglect to ensure the future use of the resources (Fadare, 2010; Twerefor, 2009). It is the sustainable use and protection of natural resources both renewable and non renewable including plants, animals, mineral deposits, soils, clean water, clean air and fossil fuels such as coal, petroleum and natural gas (Encarta Encyclopedia, 2009). Physical planning is the stimulation of appropriate actions. Land use and physical planning exercises provide a forum in which the interests of multiple stakeholders as well as the physical, social and economic constraints on land use can be debated and balanced in the post-disaster contest (Safer home and Stronger Communities, 2010)

The basis for this study is found in Nigerian Urban and Regional Law Decree No 88 of 1992. The law interprets development as “carrying out of any building, engineering, mining or other operations in, on, over or under any land” (Nigerian Urban and Regional Planning Law Decree Number 88 of 1992). Mining companies in most countries are regarded to follow stringent environmental and rehabilitation code in order to minimize environmental impact and avoid impacts on human health. These codes and regulation require the common steps of environmental impact assessment which is a subset of physical planning (Wikipedia, 2011). This paper therefore highlight the current state of minerals mining operations in Nigeria, examine the impact of mineral exploitation in the host community positing the case of Igbeti marble Mining in Oyo state of Nigeria. The study also provides recommendation towards minimization of negative impact of solid mineral exploitation on the host community.

S/No	Solid Mineral	Locations Of Deposits By States	Estimated Reserves
1.	Barites	Nassarawa, Taraba, Benue, Cross River, Zamfara	800metrictones
2.	Gypsum	Yobe, Adamawa, Ogun Gombe, Sokoto, Edo	1billion tonnes
3	Kaolin	Ogun, Kogi, Imo, Rivers, Anambra, Kebbi, Ondo, Ekiti, Akwa Ibom, Katsina and Plateau	3 billion tones
4	Talc	Kogi, Kaduna, Niger, Ekiti, Yobe, Osun, Kwara, Taraba and Kaduna	100 million tones
5	Diatomite	Yobe	Not available
6	Bentonite	Edo, Kogi, Ogun, Ondo and Borno	
7	Limestone	Cross River, Ogun, Benue, Gombe, Ebonyi, Sokoto, Edo and Kogi	800 million metric tones
8	Clay	All the states of Nigeria including Federal Capital Territory (FCT)	Not available
9	Dolomite	Kogi, Oyo, Edo, Kwara and FCT	Not available
10	Bismuth	Kaduna	Not available
11	Tin ore	Plateau State	Not available
12	Granite	All the states of Nigeria including the FCT	Not available
13	Magnesite	Adamawa and Kebbi States	Not available
14	Marble	Kogi, Nassarawa, Ekiti, Kwara and Igbeti-Oyo	Not available
15	Feldspar	Sokoto and Ogun	Not available
16	Mica	Taraba	Not available
17	Phosphate	Kaduna and Niger	Not available
18	Fluorite	Ekiti, Taraba, Kogi, Kwara and Oyo	Not available
19	Kyanite	Kano, Jigawa, Delta, Lagos and Ondo	Not available
20	Quartzite	Niger, Osun, Kebbi, Kaduna, Kogi, Kwara and Zamfara	Not available
21	Silica Sand	Kano, Jigawa, Delta, Lagos and Ondo	Not available
22	Gold	Niger, Osun, Kebbi, Kaduna, Kogi, Kwara and Zamfara	120,000 ounces

S/No	Solid Mineral	Locations Of Deposits By States	Estimated Reserves
23	Coal	Enugu, Imo, Kogi, Delta, Plateau, Anambra, Abia, Benue, Edo, Ondo, Bauchi, Adamawa and Kwara	3.0 Billion tones 600 million proven reserves
24	Bitumen	Lagos, Ondo, Ogun and Edo	42billion tones
25	Considerate	Kano, Bauchi, Plateau, Kaduna and Osun	3 billion tones
26	Iron ore	Kogi, Kaduna, Enugu, Niger, Nassarawa and Zamfara	Not available
27	Lead	Ebonyi, FCT, Plateau, Cross River and Zamfara	Not available
28	Zinc	Ebonyi, Plateau, Cross River, Zamfara and FCT	Not available
29	Manganese	Kebbi, Katsina and Zamfara	Not available
30	Imennit-Rutile	Bauchi, Plateau and Kaduna	Not available
31	Wolframite	Kano, Kaduna, Bauchi and Niger	Not available
32	Lithium	Nassarawa	Not available
33	Tantalite	Nassarawa, Kogi, Osun, Gombe, Ekiti, Kwara, Cross river and FCT	Not available
34	Silver	Kano	Not available

Table 1: Locations and estimated reserves of Solid Mineral Deposits by states in Nigeria

Source: Federal Ministry of Solid Minerals Development, 2010

### Study Area

Igbeti is located on latitude  $8^{\circ} 38'$  and  $8^{\circ} 53'$  North of the equator and Longitude  $4^{\circ}$  and  $4^{\circ} 15'$  east of the Greenwich Meridian. The town is about 180km away from Ibadan, the Oyo State capital of Nigeria, 50km from Kisi, the headquarter of Irepo Local Government and 44km from Igboho, the headquarter of Olorunsogo local government in the same state. It is about 60km away from Ilorin the capital of Kwara State of Nigeria. The settlement covers an area of about  $14\text{km}^2$  and is blessed with beautiful scenery. It is situated nearly enclosed a valley which is about 360metres below sea level. Igbeti is an ancient town with the total population of 81,339 according to 2006 population, census. The community is located in the homeland of the Yoruba speaking people of Nigeria. This tribe represents the pioneer settler of the town and occupies the core area. Other tribes that inhabit the community are Hausa, Igbo, Nupe from Nigeria. These tribes also occupy the suburb area of the town.

Economic activities of the town are farming, trading and mining. Despite the abundant deposit of marble mineral in the town, only farming and trading take the lion share in the distribution of the occupation. Almost all people engage in these two occupations. Marble deposit was discovered in large quantity in Igbeti in 1969. The discovery was made as a result of demand for Marble by an Italian firm, the Renaissance Marble works

in Lagos who had been yawning for prospect marble business in Nigeria. The company met the land owners, and applied for Mining Lease of 300 meters by 600 metres and the compensation was agreed upon in 1969. The Igbeti marble mining began operation in the same year. The marble mineral is an underground deposit. Exploitation began with the use of bulldozer and grader to remove top soils, blasting follows with the use of AN/FO, a blend of ammonium nitrate fertilizer with fuel oil. Marble blasting which is the first stage appear in large lump. The lump is then given secondary drill of about 34 millimeter holes into the big lumps to further reduce the size for easy transportation to quarry. The scrapper is being used to transport the marble lumps to the crushes while the pay headers is being used to load the mineral to the quarry where the stone is reduced to various sizes. The Figure 1 shows the study area.

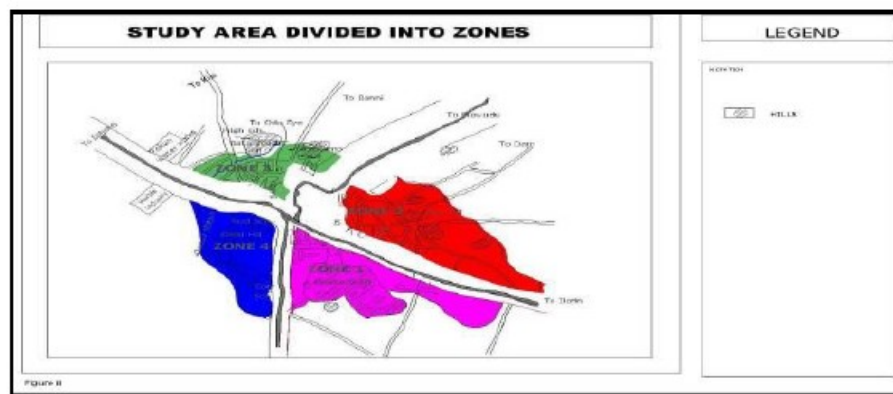


Figure1: Source: Ministry of Land and Housing, Oyo State; 2011

### Methodology

Data for this study was sourced from both primary and secondary sources. The primary source includes observation, interview, questionnaire administration and measurement of distance of building from mining site. Observation method unveiled personal knowledge of the study area in order to explore salient features and land use to know the functions, operations, problems and the effects of mining activities in the study area. Oral interview was conducted with the selected community leaders in the area to obtain information on the existing situation in the community

Information on demographic characteristics and negative effect of mining activities were sought out through the questionnaire administration. Township road network map of the town was used for easy collection of data on the negative effect of mining in the town. With the aid of the map the town was divided into four residential zones, namely; 1, 2, 3 and 4. Zone 1 is from the local government secretariat on the south east of Igboho

Ilorin road and stop at Seriki junction passing through the Apata Alaje road. Zone 2 is the northeast of Zone 1, that is, eastern part of passes through Elewudu road Igbeti – Ilorin road. Zone 3 is located on the left side of Elewudu road from Seriki market junction and terminates at marble mining site. While Zone 4 is located on the west side of Zone 1 Igboho– Kisi road (see the map of Igbeti). The existing 961 buildings in the town as at the time of this research were surveyed but only 866 were eventually returned. The authors considered this number manageable, considering the number of field assistants at their disposal. Information was elicited from this population to arrive at this report.

### **Discussion Of Findings**

The data obtained from the respondent's shows that 55.1% of the respondents were male. The percentage of the respondents that were in ages categories of 17-25 years was 21.95% which was the highest. This follows by 26 – 45 which is 19.51% while 13.57% were between 45 – 55years old. The occupational structure of the labour force indicates that the percentage of the population that engaged in farming were 46.5% followed by 34.6% who were traders while 4.5% and 3.5% were civil servants and miners respectively. With respect to income, finding shows that 62.5% of the respondents are earning between N 10,000 – N 15,000 on monthly basis while only 17.3% earn between N 7,500 – N 10,000. Additionally, 34% of the respondents have primary school certificate followed by 28% who could boast of secondary / technical certificates. Out of the total area of 1,447.216 hectares, only 592.51 or 40.96% were built up areas of which residential land use was the predominant uses.

Mining activities in the study area are in no doubt associated with destruction of human habitat and formation of pits. As at the time of this research, more than 15 pits of 25 meters in diameter and 30 meters deep each were formed from the inception of the marble mining operation. The negative effects are generation of dust at quarry, noise, vibration among others.

Table 2 shows the distance of buildings to the marble mining site. In Zones 1 and 2, there was no building found between 0 – 4km to the marble mining site. Only 92 and 96 buildings were found in the distance between 2 – 3km in Zones 3 and Zone 4 respectively.

Table	Numbers of Building per Zone						
	Distance	Zone 1	Zone 2	Zone 3	Zone 4	Total	%
	0 – 1km	Nil	Nil	Nil	Nil	Nil	0.00
	1 – 2km	Nil	Nil	Nil	Nil	Nil	0.00
	2 – 3km	Nil	Nil	92	96	188	21.71
	3 – 4km	76	73	83	80	312	36.03
	4km and above	110	113	73	70	366	43.26
	<b>Total</b>	<b>186</b>	<b>186</b>	<b>248</b>	<b>246</b>	<b>866</b>	<b>100</b>

Table 2: Distance of buildings to the Marble Mining Site

Source: Author's field Survey, 2011

Table	Numbers of Building per Zone						
	Distance	Zone 1	Zone 2	Zone 3	Zone 4	Total	%
	0 – 1km	Nil	Nil	45	51	96	11.08
	1 – 2km	Nil	Nil	68	51	119	13.74
	2 – 3km	08	11	38	40	97	11.20
	3 – 4km	64	51	68	70	253	29.22
	Above 4km	114	124	29	34	301	34.76
	<b>Total</b>	<b>186</b>	<b>186</b>	<b>248</b>	<b>246</b>	<b>866</b>	<b>100:00</b>

Table 3: Distance of Buildings to the Marble Work

Source: Author's Field Survey 2010

Also, Table 2 shows the distance of building development to where marble are broken into pieces. Information in table 3 reveals that no building was found between 0 – 2km in Zones 1 and 2, but in Zone 3 and Zone 4, the number of buildings found in distance range of 0 – 1km in Zones 3 was 45 while 51 were found in Zone 4. Also, 68 buildings and 51 buildings were found in distance of 1 – 2km in Zones 3 and 4 respectively. Buildings development was gradually increase from 2 – 3km to above 4km in Zone 1 and 2 but reduces in above 4km in Zone 3 and Zone 4. This is due to the fact that the 4km and above in Zones 3 and 4 were developing faster than other two zones. This is due to their proximity to marble mining area of the town. Ironically, buildings were found closer to the mining site rather than being fear from the adverse condition of the industry. To the dwellers, they felt it is more advantageous to live closer to the marble industry because of the proximity to work.



Effects	Zone 1	Zone 2	Zone 3	Zone 4	Total	%
Noise	Nil	Nil	13	13	26	12.09
Vibration	Nil	Nil	14	10	24	11.16
Crack wall	Nil	Nil	09	07	16	7.40
Dusty Air	Nil	Nil	08	09	17	7.91
Noise and vibration	Nil	Nil	19	15	34	15.81
Vibration and crack wall	Nil	Nil	36	32	68	31.63
Noise, vibration and dusty air	Nil	Nil	14	16	30	14
Total			113	102	215	100%

*Table 4: Effects of mining activities in Igbeti community by each zone*

*Source: Author's Field Survey 2011*

From Table 4, it can be inferred that the respondents to all effects of mining activities were from Zones 3, and 4. The number of cases as shown in table 4, reveals that only 26 buildings or 12.09% of total building in Zones 3 and 4 were experiencing the noise from quarry and mining site, 24 buildings or 11.16% experience vibration when stones are blast, 16 buildings or 7.40% have wall crack as a result of Vibration. Dusty Air is been noted by only 17 buildings or 7.91%, 34 buildings or 15.81% experience both noise and vibration while 68 buildings or 31.63% experience vibration and crack walls. Lastly, noise, vibration and dusty were noticed by 30 buildings or 14% of all the buildings within the limit of 0 - 2km to the mining and processing site. Vibration from marble blast and the equipment used take effect up to a distance of 2 km to the extend that furniture in the offices and home do shake some times.

Our visitation and interview at the mining pits revealed that the town has over 15 mining pits which are presently uncovered and pose serious danger to the people of the town. Similarly, the residents and the local planning authority expressed their worries for the non-implementation of the mitigation measures of the Environmental impact assessment of the mining industry. This according to them would have relived some of the problems created by the mining activities in the town.

The case of land litigation among the original land owners, some families and the marble industry was also brought up during our investigation. This is a major course of in-fighting in the town, and according to the people, they are expecting some good to be done about it.

It was also discovered that the town has no functional development or master plan. The town is being left to grow any how without concerted effort for tree planting, development control and other control measures by the government and or its agents.

It was revealed that the mining activities of the marble industry have been a threat to physical development. The marble mining has about 300 hectares of devastated land. It has also destroyed the natural habitat of the area. The nearness of the quarry and mining site to residential areas have resulted to cracks in some building which consequently weakened and shortening the lifespan of the housing units in the study area. This is not too far from the report of Gbadamosi and Omole, (2003) in which they reported that resource areas do suffer untold hardship.

Many species of plants have been lost due to dropping of hazardous waste from the marble industry on the leaves of plants in the area. People living closer to this site have also been inhaling dusty air which on the long might causes lung disease. Furthermore, mining pits and wasted marble dunes created on about 300 hectares have made the land less valuable for development. It was told that many youths and adult have lost their lives on the mining pits either when fishing or trying to fetch water Also, there are cases of erosion cutting of farm road as a result of mining activities. Moreso, lack of awareness of the role of community has resulted into litigation among the people over the lease agreement of the mining sites. This has resulted into low development, because a good and peaceful atmosphere is a perquisite for physical development.

This study has established that mining activities have negative effects on the physical development of Igbeti Community in Nigeria. The factors responsible for the negative effects both on the settlement and the people of the study area have also been identified and discussed. The following recommendations are being put forward to reduce the effects of mining activities to a manageable level.

Physical Development plan that will guide and control physical development of the mining areas in Igbeti town should be prepared. The primary aim of this type of physical development plan is to mitigate the injurious effect of mining in the immediate environment of the mining sites. The highlight of the physical development plan for mining activities in Igbeti should include land use zoning. Zoning regulation policy will give reasonable consideration among others to the particular uses and to be drafted with a view to conserving values of buildings and encouraging the most appropriate use of land throughout the resource area.

Restoration of already mined area is also recommended in the physical development plan. The existing heaps of wasted marble pile up can be used to fill some mining pits. It is recommended that economic trees should be planted to reclaim the land. Some of these mining pits can be used for fish ponds and tourist objects if properly harnessed. This will

generate employment and revenue for both the community and the government. Resettlement scheme for those living in areas closed to the mining and processing sites should be resettled elsewhere and duly compensated. Also, Environmental Impact Assessment reports approved for mining operation in the community should be reviewed regularly so as to harmonies the new development with the host community. The physical development plans should also incorporate integrated marble mining projects. The integrated marble mining projects will bring in other industries that will make use of the processed marble products as their raw materials. Such industries include tooth paste making industries, asbestos, sculpture and ceramic companies. All these, if put in place, will increase the socio-economic development of the area and that of the country in general. Implementation is a pivot of success of any good plan or policy. For the successful implementation of the proposal of this recommendation, various government agencies, corporate bodies and public should be involved and it should be a continuous exercise.

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