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# Ethical Evaluation of the Impacts of Mining in Ebonyi State, Nigeria

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## ABSTRACT

This paper titled “ethical evaluation of the impacts of mining in Ebonyi State, Nigeria” was carried out to find the extent to which mining operations in Ebonyi State were consistent with named ethical principles. It was geared toward unearthing the history of mining in Ebonyi State, examining the impacts of mining in Ebonyi State and evaluating the impacts of mining in the light of some ethical principles. Data were collected through oral interviews and use of available data in printed records, reports journals, text books and so on. The following were the findings of this research: In the early 30’s, local miners in Ebonyi State (the villagers) engaged in artisanal quarrying/ mining of lead employing local methods before the coming of expatriate miners in the early 40’s. Mining has impacted positively in various dimensions to the development of the State; the negative impacts are however severe and include habitat modification, deforestation, contamination of air, land pollution, underground and surface water pollution, destruction of roof tops through fly-rocks, soil erosion, crack effect on houses resulting from blasting, noise pollution, socio-political impacts and so on. The impacts were found to be a negation to the ethical principles of justice, human rights and sustainability. The viable means of ameliorating the impacts were found to include: value re-orientation and education of miners to appreciate the above ethical principles; organizing awareness campaigns and sensitization programme for people living in mine areas; diversification of the economy of Ebonyi State through prioritizing agriculture in order to shift emphasis from mining; organizing artisanal miners into groups and co-operative societies for easy training and monitoring; enforcement of mine closure, revegetation and resettlement of fauna.

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## Introduction

Swaziland Natural Trust Commission (2007) holds that mining of stone and metal had begun since pre-historic times, (that is before dating began) with available archeological records putting the dates at 43,000 years ago. At this time, Paleolithic humans mined hematite to make the red pigment ochre. The oldest mine according to the above record is the “Lion Cave” in Swaziland. There are also speculations that mines of similar age exist in Hungary and may have provided flint for weapons and tools. Hartman (1992) opines that early tools and weapons were especially made of flint mined for example at Grime Graves. These flint mines are Neolithic in origin dating as far as ca 4000 BC – ca 3000 BC. Other hard rocks mined or collected for axes at this period included the greenstone.

The industrial revolution of 1700 is strongly believed to have triggered off modern large-scale mining. As documented in Nigerian Ministry of Solid Mineral Development (2006), mining was one of the oldest economic activities in Nigeria with evidence of a flourishing iron-working civilization of the Nok culture around 340 B.C. At about 705 AD, the Igboikwu bronze civilization also reached its pre-eminence. At about 1,000 years ago, the Hausa Kingdoms with the famous ‘Golden Lands of Wangara’ were noted for their gold mining, Ife and Benin were also noted for bronze works between 1163–1200 and between 1630–48, respectively. These artistic civilizations, using metallic and non-metallic substances, reflect the ancient origin of mining in Nigeria.

Organized mining began with the establishment of the mineral surveys of the Southern and Northern protectorates in 1903 and 1904 respectively. Nigeria at a point became a major producer of tin, columbite and coal for export. The downturn in mining followed the discovery of oil in Oloibiri in 1956 and the Exodus of mining expatriates during the Nigerian Civil War between 1966 – 1970.

Howbeit mining activities still go on in Nigeria today and there are evidences of Lead-zinc mineralization in Ebonyi State classified in the lower Benue Trough of Nigeria, Ministry of Solid Mineral Development, (2006). The lead zinc mineralization occurs in Ishiagu, Enyigba, Ameri and Ameka, with small-scale and artisanal mining activities in these areas.

There is no doubt that mining is contributing to the economic boost of Ebonyi, however, the impacts are quite enormous on Ebonyi Environment, such as Acid mine Drainage (AMD), Erosion and sedimentation, heavy metal leaching and contamination, and et cetera. These are known to constitute serious health threats to lives.

Hence, the worry that no one seems to understand and care about the danger ahead if the situation is unabated, has necessitated this study, which is geared to discuss the impacts of mining in Ebonyi state. The study will evaluate the harmful environmental effects of mining in the state in the light of some moral principles namely: justice, human rights and sustainability.

### Clarification of Concepts

There are number of concepts to be defined such as Ethics, Ethical Evaluation and Mining. Proper explanation of these concepts will make for a better understanding of their usage in the context of this present research.

### Ethics

Singer (1979) explains that ethics is a universal set of principles, laws that govern human actions, which help to realize a universalizable judgment from the standpoint of an impartial spectator or ideal observer. He outlined some of these principles as individual's rights, the sanctity of life, justice, purity and so on.

Nzomiwu (2012) explains that ethics means one of two things: either the theory of what is right or wrong in human conduct or the body or system of what is regarded right or wrong in human action. In summary therefore, ethics in the context of this research is a study of the norms or standards of human behaviour.

### Ethical Evaluation

Having attempted the meanings of ethics, brief explanation of the concept "ethical evaluation" will go a long way in describing the task of this present research. Thus, ethical evaluation of the impact of mining will require an appraisal of the subject – "impact of mining", in the light of some ethical principles or standards. The argument here is that it is the gross violation of the norms, standards and regulations in mining that has brought about the impacts of mining, not because miners are ignorant of these regulations, but because they lack the moral will to implement the rules. Hence the task of this paper is to put forward those relevant moral principles or standards of behaviour that will help form the right character and attitude in the miners and indeed all stakeholders in mining. The right character when imbibed will naturally produce the willingness to obey mining regulations.

### Mining

International Labour Organization (ILO) (1995) in its 82<sup>nd</sup> session defined the term "mine" as covering:

- a. Surface or underground sites where the following activities, in particular, take place:
  - i. Exploration for minerals, excluding oil and gas, that involves the mechanical disturbance of the grounds;
  - ii. Extraction of minerals, excluding oil and gas;
  - iii. Preparation, including crushing, grinding, concentration or washing of the extracted materials; and
- b. All machinery, equipment, appliances, plant, buildings and civil engineering structures used in conjunction with the activities referred to in (a) above.

From the foregoing therefore, mining may be defined as: the exploration for and extraction of minerals excluding oil and gas, through surface or underground methods, using machines and materials.

### Brief Information on Ebonyi State.

Historical information about Ebonyi contained in Ebonyi State Ministry of Commerce and Industry publication (2012) shows that Ebonyi State was created on October 1, 1996 with Abakaliki as its capital. The state was carved out of the former Abia and Enugu States. It derived its name from the Ebonyi River which is one of the major water ways that traverse the entire state linking it with Cross River and Benue River with their numerous tributaries. With a total landmass measuring approximately 5,935 square kilometers, Ebonyi State lies between the latitude 07° 05'N and longitude 08° 30'N. It is bordered on the east by Cross River State, to the North by Benue State and to the West by Enugu State, while Abia State

occupies its Southern border. Its altitude is 91.44 meters above sea level. The annual mean temperature in Ebonyi State is in the range of 15°C to 29°C.

### Administrative Areas

There are thirteen Local Government Areas (LGAs) in the State divided into three senatorial zones namely: Ebonyi North comprising Abakaliki, Ebonyi, Ishielu, Ohaukwu and Izzi LGAs; Ebonyi Central made up of Ikwo, Ezza North and Ezza South LGAs; and Ebonyi South made up of Afikpo North, Afikpo South, Ivo, Ohaozara and Onicha LGAs.

### Mineralization in Ebonyi State

Ebonyi State is blessed with abundant mineral resources which are found in commercial quantities and scattered throughout the State. However, despite the confirmed abundance of these resources, they are yet to be fully and industrially exploited.

The vegetation of Ebonyi State is a mixture of Savannah and Semitropical forest. Ebonyi State has rich water resources confirmed by the fact that its name was derived from Ebonyi River. These natural attributes have endowed the state with enormous potential for sustainable agriculture and food security. With its favourable climatic condition as well as availability of arable land, Ebonyi State remains a force to be reckoned with in the production of both cash and food crops. As the mainstay of the state's economy, agriculture provides gainful employment for about 90 percent of Ebonyi people. With the thriving of many food and cash crops like rice, yam, cassava, groundnut, cowpea, maize, oil palm, cashew as well as citrus which are produced in commercial quantities, the state is justifiably and fondly referred to as the food basket of the South eastern zone of Nigeria.

However, due to the fact that agriculture is carried out extensively on a subsistence level, and that it is predominantly labour intensive, employing the use of such crude farming implements like machetes, cutlass and hoes among others, the sector is plagued by under utilization of resources which in itself has resulted in lower crop yield for the farmers. The strategic location of the state is an added advantage to investors as it is located next door to the Export Processing Zone in Calabar, just across the river from Afikpo; Port-Harcourt, a Commercial Sea Port Complex; and Onitsha the Biggest market in West Africa. Its large network of fast going highways and proximity to two international and two domestic airports makes traveling fast, efficient and easy.

Demographically, Ebonyi has a vibrant annual growth rate of over 2.83% pushing its current population to over 3 million people. This population is over 60% rural with women constituting about 53%. The major religion is Christianity professed by more than 90% of the population. Culturally, the homogenous people of Ebonyi practice extended family structure. Family system is both patrilineal and matrilineal. Events and ceremonies derive value from festivals which are programmed by market days and dates. Ebonyi people are basically Igbos, speaking Igbo language with minor dialectical differences.

### Mining in Ebonyi State

Mbam Darlington and Ekpe Samuel Nwangb (personal communication November 20, 2014 and November 14, 2014) respectively date earliest mining activities in Enyigba, (Abakaliki LGA) Ameka Ezza-South and Ameri as far as before colonial era. At this period the Dutch mined lead and Zinc in these communities. Apparently now at the sites are evidences like ditches, abandoned machines, heaps of overburden and make-shift buildings.

These mines were not properly closed. The above sources further explain that Mkpuma Ekwaokuko mine in Ezza Inyimagu in Izzi LGA also witnessed early mining activities in the 1940s where Lead was mined underground. Quarrying (a major type of mining) is said to have begun decades before the creation of Ebonyi State in 1996.

At Ihetutu, Ishielu in Ivo L.G.A. of Ebonyi State, Elder Paulinus Okoro (personal communication June 18, 2015) said that mining of Lead/Zinc began in 1948 by an expatriate company called Amalgamated Tin Mining of Nigeria (ATMN). This company left at the heat of Nigerian Civil war abandoning the underground mine which was not properly closed. Subsequently, C.C. Daniels overseas Ltd took over the lease, mined lead/zinc and succeeded in shipping the mined materials overseas. The company left after a misunderstanding with the community. Okwuosa Brothers & Sons Nig. Ltd took over still on the same lease, and was more of a family company. When Okwuosa died, the company collapsed as the children were no longer able to continue the business. They now leased it to Ped Magrek Nig. Ltd owned by Chukwu Ike, who mined lead/zinc, Buxite and et cetera. At the death of Chukwu Ike, Dr. Onuora, the Managing Director of Gexpam took over. After him came Henry Ahanotu, the owner of Greenfield metals Ltd. who occupies the leases till date. On the other hand, organized quarrying by a gigantic German Company, in Ishiagu called Crushed Rock began operations in 1978. Before this date, oral tradition holds that other expatriate companies had operated but also left.

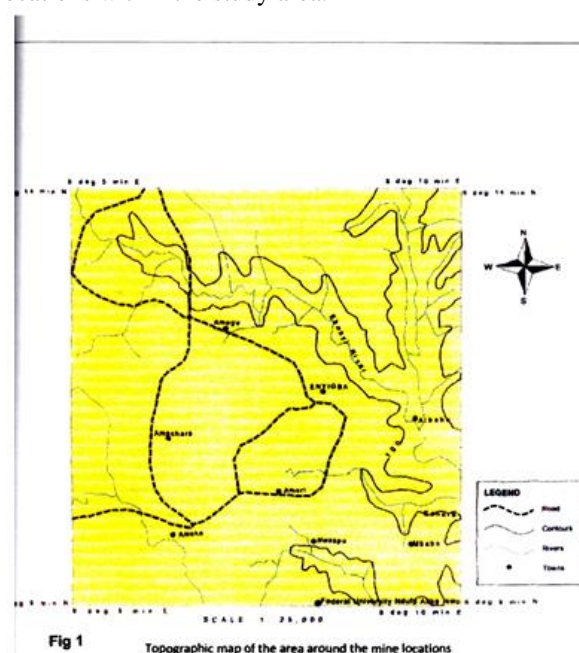
Chukwu N. Ifeanyi (personal communication June 18, 2015) has it that at Ihetutu village in the early 30's before the coming of expatriate mining company in 1948, the villagers mined lead using crude methods which exposed them to emissions from lead. As a result, most pregnant women gave birth to crippled children, a phenomenon that was attributed to affliction from water goddess believed to have come from the lakes formed through mine pits. With the coming of civilization and enlightenment, it was however discovered that it was not water goddess but lead emissions that afflicted them.

In 2001, Southeast Development Company started mining in Enyigba but their disagreement with the Federal and State Government made them to leave in 2003. At the moment, there are about 25 quarries operated by different companies and about 14 artisanal and large scale mines. On December 11, 2010, Ebonyi State entered into a mining lease agreement with an expatriate company, Royal salt for the exploitation of lead zinc and salt discovered in commercial quantities in Ameka Community (Ezza South), Ameri (Ikwo) and Enyigba Communities (Abakaliki) Local Government Areas. The mine bedrock at Enyigba is about 350ft deep.

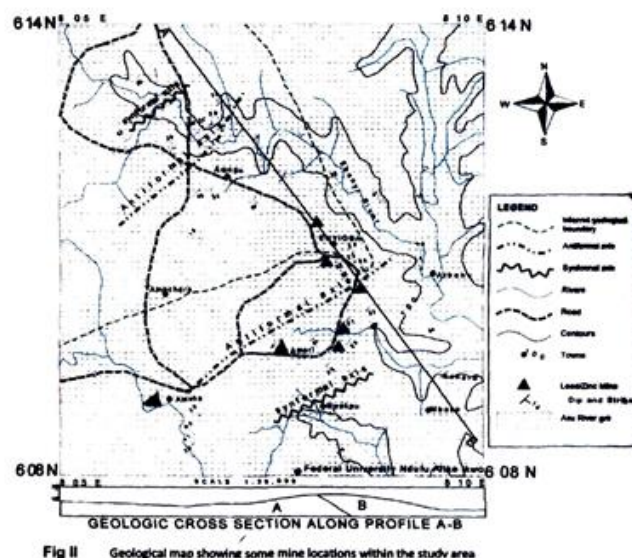
Royal Salt mining company currently mines lead/zinc at Ameri having been sacked from Ameka and Enyigba Communities for lack of due consultations with those communities. The 25 Quarries are spread across the following communities: Umuezeaka Ammofia Ngbo, Ukwagba, Ezzangbo, Umuogbara, Nkalagu, (Mkpuma Akpatakpa; Sharon; Ndieze) in Izzi Ebonyi North and Ishiagu, Amasiri, Afikpo Akpoha Ebonyi South. On the other hand, the Lead-Zinc Mines are located in these Communities: Ameri, Ohankwu, Enyim Agalegu, Alibaru (all in Ikwo LGA) and Ameka (Ezza South LGA). These first groups of communities are in Ebonyi Central. Others are Nkpumaekwaokuko and Ikenyi, in Izzi LGA and Enyigba in Abakaliki all in Ebonyi North. The last is Ihetutu, Ishiagu in Ebonyi South.

Of the Fourteen (14) mines in the above communities only two mines in Ameri and Ishiagu are operated by mining companies- namely: Greenfield and Royal Salt, others are artisanal mines.

The maps below are topographic map of the area around the mine locations and Geologic map showing some mine locations within the study area.



Source: Dr. A. C. Ekwe. Department of Geology/Geophysics, Fed. University, Ndufu-Alike, Ikwo



Source: Dr. A. C. Ekwe. Department of Geology/Geophysics, Fed. University, Ndufu-Alike, Ikwo

The geologic map indicates that there are three mines in Enyigba, two in Ameri and one in Ameka, Communities in Abakaliki, Ezza South and Ikwo LGAs of Ebonyi North and Central Zones. The other mines operated by companies not captured in the map are located in Ishiagu (Ebonyi South). Mining in Ebonyi State replicates three types of surface mining, namely open-pit mining, strip mining (open-cast mining) and quarrying. Hartman (1992) opines that mining techniques can be divided into two common excavation types: surface mining and sub-surface (underground) mining and further notes that at the present, surface mining is much more

common and produces about 85% of minerals (excluding oil and gas) and 98% of metallic ores in the United States. Surface mines normally only extend between 100 – 200m, below which it is regarded as underground mining. However, the depths of the mines in Ebonyi are not beyond 100 – 200m approximately. This suggests that they are all surface mines.

#### **Impacts of Mining in Ebonyi State**

This segment of the paper considers the economic, environmental and health impacts, and Socio-political impacts of mining in Ebonyi State.

##### **4.1 Economic Impacts**

Jennings (2011) states an obvious fact that minerals and mineral products are the backbone of most industries. Some form of mining or quarrying is carried out in virtually every country in the world and has important economic, environmental, labour and social effects – both in the countries or regions where it is carried out and beyond. For many developing countries, mining accounts for a significant proportion of GDP and often for the bulk of foreign exchange earnings and foreign investment. For example, in Nigeria, the discovery of blue diamond and other precious stones in the remote village of Mayosina, Mambilla Plateau in Nguroje Sardauna of Taraba State in January 2014 has changed the jungle to densely populated settlement with an average population of over 200,000 persons. It is now a source of rich employment and livelihood for artisanal miners made up of Nigerians and Foreigners from neighbouring West African Countries like Niger, Cameroun, Ghana, Chad, Ivory Coast, Togo, Benin Republic and Senegal. These make huge sums of money from buyers who are readily available from different parts of the world. The above story holds true in Ebonyi where artisanal miners get paid a minimum of N8, 000- N9, 000 per fifty kilogram of pure lead, whereas 50kg of lead with impurities is sold between N4000-5000. It was discovered that different groups in mining communities owned their pits. A pit owned by an artisanal miner employs about 30 women and 37 men.

There is no gain saying that artisanal miners make a lot of money from lead mining in the State. From the proceeds, they send their children to school and solve other domestic problems. At Ishiagu where the crushed Rock Company is situated it is an beehive of business activities 90% of the haul trucks are owned by the villagers who make huge sums of money from it. It was observed that very beautiful houses – bungalows and Duplexes in the communities in Ishiagu were owned by men and women who have one business or the other to do with crushed rock company Ltd. The State Government on its part derives revenues from levies on business permit, tolls for haulage and other proceeds from about 30 companies involved in quarrying and mining in the state. This has served as a boost to the state's Internally Generated Revenue (IGR). Apart from the IGR that accrues to the state from the operations of these companies, other revenues are paid to Ministry of Solid Minerals, Federal Inland Revenue in addition to Ministry of Commerce and Industry. The companies on the other hand, provide employment for youths helping to reduce unemployment in the state and its attendant effect of high crime wave.

Additionally, these companies from inception enter into a memorandum of understanding with their host communities in which some developmental roles of the companies towards the communities are agreed. The Ministry of Commerce and Industry in the state monitor the companies and their operations mainly to ascertain the companies' level of

compliance to the MOU in their host communities and to make sure that government revenues are collected from them. These MOU range from scholarship schemes to construction of roads, hospitals, class room/hostel blocks, et cetera. For example Heninghorfen Primary school at Amaokue was built by Crushed Rock. These areas outlined above mirror positive impacts of mining in Ebonyi State.

However, the negative impacts of mining in Ebonyi State apparently are quite enormous. Mining in the state has brought about Loss of biodiversity; Acid mine drainage; effluent emission and contamination; Soil/Gully erosion; fugitive Dust emission; Noise Pollution; Blasting effects; and Colossal health hazards among others.

##### **4.2 Environmental and Health Impacts**

According to Deacon Njoku Iheanyi (personal communication June 18, 2015) in the course of large scale quarrying and metallic ore mining in Ebonyi State, natural vegetation for wild life is being destroyed as a result of excavation activities which remove vegetation, topsoil and displace fauna. Wildlife referred herein are all plants and animals (and or organisms) that are not domesticated. Survival of these species depends on the soil which is often disturbed in the process of removing overburden. In Izzi forests beside Ebonyi River the forest was a habitat for lions, pythons and other wild life, before the exploration/exploitation of Lead/Zinc in the early 1940s. Today, those species of wild life have gone extinct as there were no re-vegetation and mine reclamation plans by the early miners. More so, this scenario plays out in these areas of mining and quarrying because they are mostly done in forest areas with hills, valleys and rivers, that initially served as natural habitat to animals and organisms.

Apart from displacement of flora and fauna, Deacon Njoku Iheanyi who is the Operation Manager Crushed Rock Ishiagu, confirmed that natural sources of water most times are closed, because of the effect of mining/quarrying operations on the hydrogeology of the areas. For example the springs that served Amaokue, Ngwogwo and Okue communities had to be closed because of the operation of Crushed Rock Company Ltd.

##### **Acid Mine Drainage (AMD)**

Nathaniel G. Doekoo's (personal communication January 14, 2015) explained that hardrock mining or metallic ore mining exposes rocks that have lain exposed for geological eras as well as walls of open-pits, tailings and mined materials. When all these materials are exposed to oxygen and water, acid can form if iron sulfide minerals are abundant and there is an insufficient amount of neutralizing material to counteract the acid formation. The acid then in turn leach or dissolve metals and other contaminants from mined materials and form a solution that is acidic, high in sulfate and metal-rich (including elevated concentrations of cadmium, copper, lead, zinc, arsenide, etc.). In Ebonyi State, the mined metals are mostly lead and zinc which are heavy metals on their own and found in rocks with sulfide minerals. Here and there, one can see heaps of rock piles, dumped tailings and open-pits often with water which are strong indications that AMD is already taking place. Experts explain that streams/rivers impacted by AMD have a PH value of 4 or lower similar to battery acid. A look at the geologic map earlier mentioned shows rivers criss-crossing the mine areas which further gives credence to the evidence of AMD impact and water contamination.



In Enyigba, Ameka and Ameri in particular, and Ebonyi in general open mine pits are seen everywhere around the mines with little or no neutralizing materials. Shocking enough, villagers make use of the water in these pits. This is quite lethal and poses health risk to individuals using it for domestic and other purposes. More shocking is the fact that AMD contaminates underground water meaning that the impact permeates beyond the mine areas to affect neighbouring towns and villages of considerable distances away from mine locations. Mr. Nathaniel Doekoo's further explained that AMD is also known to leak into the air as evaporation takes place polluting the air and making it unfit for every life in the area. In actuality, Ebonyians living in mine areas and beyond are gradually accumulating heavy metals and acid in their body without knowing it. There are often cases of sudden death which are not verified to ascertain causes. More often than not, such deaths which may have been as a result of poisoning from lead or related complications are erroneously attributed to witchcraft. The impact of AMD in Ebonyi is apparently a reduction in life expectancy of Ebonyians.

#### **Effluent Emission and Contamination**

Effluent means any liquid waste discharged from mining facilities including mine water tailings (that is waste that contains mixture of impurities, trace metals and residue of chemicals), acid leaching, acid mine drainage, fuels and lubricants. In Ngbo and other quarry sites, there are evidences of oil spillage from serviced machines and around fuel dumps. Pele Egbagiri (personal communication January 14, 2015) says this affects quality of underground water. In Ishiagu, mine tailings are used for road maintenance. This is highly and universally unacceptable because of the hydra-headed problems and health risks associated with it. More so, effluent emissions pollute the land and condemn it against agricultural purposes. These cause low agro yield.

In all the mining sites visited at Ishiagu, Enyigba, Ameri, Ithor in Ameka, Ihetutu in Ishiagu, Ohankwu, Agalegu, et cetera, it was discovered that mine water were drained from pits and channeled to nearby farm lands, bushes, main road and rivers. Ihetutu community also in Ishiagu has lost Okuiyi stream to pollution from the mine, quips Elder Paulinus Okoro (personal communication June 18, 2015). More so, overflow of water from mine pits kill economic plants and crops in farm lands that lie across the mine he maintained. Often times, the mine effluent flows into Ivo river connecting Okpanku river in Enugu State and also affecting Amony, Ihie, Amagu and Ogwo. At mines in Ishiagu Enyigba, effluents specifically were channeled to Ebonyi River, Ohankwu mine effluents were channeled to Ako river that cuts across Ndufu-Alike Ikwo while Amajim Ameka mine effluents were channeled to Akpara river. All these rivers are tributaries to Ebonyi River that flows into Oferekpe river, the source of water for the state Oferekpe water scheme that is supposed to supply pipe borne water to the whole Abakaliki zone.

#### **Fugitive Emissions**

The largest sources of air pollution in mining operations are from particulate matter and gas emissions. Particulate matter are transported by the wind as a result of excavations, blasting, transportation of materials, wind erosion (more frequent in open-pit mining), fugitive dust from tailings facilities, stockpiles, waste dumps and haul roads. Exhaust emission from mobile sources (cars, trucks, heavy equipment) raise these particulate levels.

The Gaseous emissions are from the combustion of fuels in stationery and mobile sources for example exhaust fumes from generators and haul vehicles. It has been identified by experts that Fugitive dust can pose significant environmental problems at "some" mines. The inherent toxicity of the dust depends upon the proximity of environmental receptor and type of ore being mined. High levels of arsenic, lead and radionuclides in windblown dust usually pose the greatest risk. The proximity issue is of major concern here because it is co-relational to toxicity of the dust and gas as a matter of fact. The quarry located along Enugu Abakaliki road does not meet the required safe distance of 3000m (3km) away from homes and residence. This particular quarry site is almost at the road and very close to a military barracks. The health effects are diseases associated with respiratory tract infections/lung diseases. Residents around this quarry often suffer from common cold and pneumonia which they ignorantly attribute to exposure to cold weather. Dust emissions do not only affect the air, but dust settles on crops causing them to change colour. Additionally, it settles also on water, thereby introducing some elements to underground water absorbed by plants.

At Ishiagu Enyigba, Oketa Friday (personal communication July 29, 2015) narrated his ordeal in a day he unexpectedly slept were he packed lead. He woke up to discover he had difficulty in breathing. He attributed that ordeal of respiratory attack to emission from lead. At Ishiagu Enyigba claim of Mrs. Ebere Eze (a nurse), (personal communication July, 29 2015) of convulsion attack was corroborated by Oketa Friday mentioned above. They lamented that children between the age bracket of 2 -10 years frequently convulsed, a situation they learnt in a seminar organized by ministry of Environment was attributable to lead emission.

#### **Soil and Gully Erosion**

Erosion is the detachment, suspension and transportation of soil particles from their original source to a different location which could be caused by water (through rain drops/precipitation run off) or wind in arid environments. The extent of erosion depends on various factors, including the degree at which the surface has been disturbed, the prevalence of a vegetative cover, the type of soil, the slope length and the degree of slope. Mining activities are known to disturb the surface, thereby aiding erosion. In Nkalagu where heavy quarrying activities are taking place, there are sites of gully erosion attributed to quarrying. In addition, experts in Geological Sciences aver that earthquakes and other adverse physical phenomenon are likely to occur frequently in these areas because of mining activities in the nearest future.

**Blasting Effects:** Blasting operations are used to crack hard rocks in quarrying. Some of the chemicals used in blasting are super power 90 (High explosives), Ammonium Nitrate (Low explosives), Jelatine explosives, et cetera explained Mr. Nathaniel Doekoo's. The concern however is that they are used beyond the recommended quantity/limit as such generating untold effects like cracks on buildings, fly rocks, building foundation collapse and outright collapse of building. At the moment, there are several of such cases now in Nkalagu, Abakaliki, Ngbo, Onuebonyi and et cetera. Some of the law-suits of cases like that are pending in the law-court. Deacon Njoku Iheanyi (earlier mentioned) maintained that anywhere blasting operations are done, at the firing of the shot, there is vibration affecting buildings, especially, those ones without civil Engineering approach.

More so, the soil type in Ebonyi, in general have some properties of clay carrying particular minerals called montmorillonite which absorbs water, swells and contracts during dry season. The dominance of this gives effect on the structures it carries, thereby making it more susceptible to cracks and collapse as a result of the effects of blasting. Eme Okoro (personal communication January 14, 2015) confirmed the effect of blasting on his building.

The incidence of fly rocks is quite high in quarrying areas in Ebonyi State. Due to overcharge of holes with explosives, the fly rocks result and sometimes destroy roofs of houses. More so, fly rocks also result from secondary blasting operation which cannot be controlled even with reduction of explosives.

#### **Noise Pollution**

This impact is obvious so much so that residents around quarrying sites in particular suffer from high degree of noise over a longer period than stipulated by law. Noise pollution can lead to loss of hearing and other hearing impairment.

#### **4.3 Socio-Political Impacts**

Socially, education which is considered to be one of the powerful instruments of socialization has been adversely affected in mining communities. At the communities visited during the course of oral interview it was gathered that children preferred going to mine sites where they provide cheap labour for money. "Some of them who attempt going to school sneak out of school and retire to mine sites", says John Emmanuel, (personal communication May 30, 2015) a private investor at Enyigba. The high level of school drop outs in the mining communities could also be attributed to mining among other factors. The tendency is that school age children get attracted to quick money made from cheap labour in mine pits and forego education.

It was also gathered that the rate of prostitution is high in those mining communities. Some of the men who work in mines make quick money which attracts commercial sex workers who are also there for "business". It was observed that many hotels, drinking joints and relaxation centres abound in Ishiagu due to the presence of the miners who visit these places after the day's hard labour. Respondents like Nwafor Juluis, Nicodemus Agbalu, David Nwokporo at Ithor Ameka testified to the fact that young people working in mine areas took hard-drugs like Tramadol, Indian Hemp, et cetera to boost their energy and morale for work, most especially, the stone breaking.

Politically, the atmosphere is usually charged and tensed up because of power tussle over community chairmanship position in Ihetutu and other Communities inhabiting Crushed Rock Company Ltd and Greenfield mining company. The community chairman is the middle man between the communities and the companies, who more often than not enjoys some privileges and benefits from the companies. For example, Crushed Rock Com. Ltd gives 3,000 tons of cheapings to the community for road construction, but most times, it is rather sold than utilized for that purpose. The money that accrues from the sale is then shared amongst the "stakeholders" with the chairman getting the lions share. Hence, the community (not LGA) chairmanship position is highly politicized and contested.

#### **Evaluation of the Impacts of Mining in Ebonyi State**

The ethical evaluation of the impacts of mining in Ebonyi state appreciates that ethics is the study of the norms or standards of human behaviour. What then are some of these standards? Singer (1979) identified some of the standards or

principles as sanctity of life, justice, purity, and et cetera. However, for the purpose of this paper, three moral principles will be employed in the evaluation, namely: justice, human rights and sustainability. The reason for adopting these principles is because the discourse borders on environmental ethics and the principles are universal moral principles that can be applied across board.

#### **Justice**

Etymologically, the word 'justice' has a Latin root 'jus', meaning right or law, this explains why it is conveniently referred to as a moral concept. Oxford English Dictionary defines the "Just" person as one who typically "does what is morally right" and is disposed to "giving everyone his or her due", offering the word "fair" as a synonym. A brief analysis of the meaning attempted so far will help to a large extent in stepping down the concept of justice to simple understanding. Every action taken is considered right or wrong given some principles, rules, laws and the nature of the action done in relation to the effect of such actions. In other words, the action taken is judged just or otherwise to the extent of its fairness to everyone concerned. Justice takes into account the inalienable and inborn rights of all human beings and citizens, the right of all people and individuals to equal protection before the law, of their civil rights, without discrimination on the basis of race, gender, sexual orientation, gender identity, national origin, color, ethnicity, religion, disability, age, wealth, or other characteristic, (Wikipedia, the free Encyclopedia). This explanation of justice alludes to "fairness to all involved". Rawls (1971) analyzed justice in terms of maximum equal liberty regarding basic rights and duties for all members of society, of equal opportunity and beneficial results for all. He regards justice as "the first virtue of social institutions" (p.3).

#### **Types of Justice and its Implication on the Impacts of Mining.**

Nzomiwu (2012) identifies five subdivisions of justice, namely: commutative justice, distributive, legal, social and retributive justice. scholars with interest in environment have developed another types of justice known as Eco-justice, purely ethechiates to the environment apart from this latest addition, the five other types have various degrees of indirect application to environmental justice. For example, Commutative justice governs interpersonal relations-the relation of individuals with regard to each other. Hearing in Nzomiwu (2012) states "commutative justice demands exact equality of value between what is given and what is due in return" (p.259). hearing further explains that the principal violations of commutative justice are theft, fraud and unjust damage. Unbridled mining causes unjust damage to the environment and therefore a violation to commutative justice talking about equality of value between what is given and what is due in return nature has provided the resources that are mined. Therefore its due to be preserved and not destroyed. It is wicked to strip nature of its resources without returning to it its due. Its due is re-vegetation, proper mine closure, resettlement of fauna replacement of Flora, and et cetera this line of argument therefore entails proportionality in terms of the give and take relations.

#### **Eco- Justice**

After the UN first earth day in 1972 at Stockholm, the term 'eco-justice' emerged out of the concern for the natural world and for human life that recognizes that devastation of the environment and economic injustice go hand in hand, and

that environmental and human rights are indivisible. Hessel (2007) recounts the emergence of the term thus:

After the first earth day, "eco-justice" became the theme of a group of North American, ecumenically engaged Christian ethicists (including the author). In a seminal article "ecological responsibility and economic justice," Episcopal priest Norman Faramelli of the Boston industrial Mission emphasized that "choosing (to work for) ecology instead of (against) poverty, or vice versa, is to make a bad choice," the way ahead is to choose both... To foster converging commitments to ecology and justice (social) American Baptist leaders Richard Jones and Owen Owens introduced the term eco-justice. By 1973, a strategy to advance integrative ethics of ecology and justice became the focus of an ecumenical campus ministry initiative at Cornwell University called the Eco-Justice Project and Network (EJPN) initiated and then coordinated for two decades by a Presbyterian social ethicist, William E. Gibson (p.1).

Gibson in Hessel (2007) thus defines eco-justice as:

The well being of humankind on a thriving earth,... an earth productive of sufficient food, with water fit for all to drink, air fit to breathe, forests kept replenished, renewable resources used as sparingly as possible so that they will be available (to future generations) for their most important uses... on a thriving earth, providing sustainable sufficiency for all, human well-being is nurtured not only by the provision of these material necessities but also by way of living within the natural order that is fitting: respectful of the integrity of natural systems and of the worth of nonhuman creatures, appreciative of the beauty and mystery of the world of nature (pp.1-2).

The concern of eco-justice hence permeates beyond environmental justice to include the exploration of specific environmental problems and related issues of hunger, sustainable agriculture, energy production and use, lifestyle integrity, economic development, debt relief, fair trade, good work, peacemaking, and environmental justice for poor people, racial minorities and women. The ethicists of eco-justice maintain that environmental justice is an important facet of, but is not synonymous with eco-justice, which has broader meaning.

However, this present paper is predominantly concerned with the environmental justice aspect of the eco-justice. Going by Gibson's definition of eco-justice, the impacts of mining in Ebonyi state is a total negation to the well-being and thriving of Ebonyians. On the way round, the mining activity that would have been considered just to the environment of Ebonyi is such that ought to have enhanced other than undermined food sufficiency, good water fit for drinking and other healthy purposes, air fit to breathe, forests kept replenished, renewable resources continuously renewed, non renewable resources used as sparingly as possible so as to be available to future generation, but the mining operations in Ebonyi have rather left more to be desired. This therefore strongly calls for a change of motive and attitude on the part of miners, mining companies, government and indeed all stake holders in mining in Ebonyi state, to embrace the virtue of justice.

#### **Human Rights and the Impacts of Mining in Ebonyi State**

John Locke the philosopher in Cranston (1973) identified human rights thus:

All men are by nature equally free and independent, and have certain inherent rights, of which, when they enter into a state of society, they cannot, by compact, deprive or divest their posterity: namely, the enjoyment of life and liberty, with

the means of acquiring and possessing property and pursuing and obtaining happiness (p.1).

Locke from the foregoing identified three human rights: right to life, liberty and property. Human rights are seen by scholars as those rights that are inherent in every person for the fact that he is a human being. Iwe (1986) asserts that human rights are "the inviolable and inalienable moral powers... of every human being to have, to do, to require from others..., to possess or give something"(p.156). According to Iwe (2000) inviolability of human rights means that no innocent person may be deprived of these rights or be stopped from enjoying them, against his will. Human rights are also inalienable implying that they are not exclusive preserve of some persons who may transfer them to others at will or determine when others are to enjoy their rights. Rather they are naturally endowed by God and rooted in the nature of man as human person.

Here in Nigeria, the fundamental human rights are contained in the 1999 Nigerian Constitution as follows:

1. Right to Life, 2. Right to dignity of human person, 3. Right to personal liberty, 4. Right to fair hearing, 5. Right to private and family life, 6. Right to freedom of thought, conscience and religion, 7. Right to freedom of expression and press, 8. Right to peaceful assembly and association, 9. Right to freedom of movement, 10. Right to freedom from discriminations, 11. Right to acquire and own immovable property anywhere in Nigeria.

Under this subject of discussion, the right to life addresses the issue is considered more fundamental. Office of the High Commissioner on Human Rights and United Nations Environmental Protection- OHCHR and UNEP (2012) in a joint report of the Rio + 20 summit recognized the relationship between human rights and the environment. They summarized the linkages between human rights and the environment thus:

The linkages between human rights and environmental protection are multi-dimensional and reciprocal. Through legislation and jurisprudence, it has become generally accepted that: failure to respect, ensure and fulfill internationally- and domestically guaranteed human rights can lead to environmental destruction by ignoring the needs of individuals and groups who can contribute to environmental protection and economic development if they are consulted and are able to participate in decision-making about activities, programmes and policies that may impact them or their surroundings; failure to conserve natural resources and biodiversity can undermine human rights, for example, by destroying resources and eco system services on which many people, especially indigenous and local communities, depend; economic and other public activities, programmes and policies can either undermine or support the goals of environmental protection, human rights and sustainable development. Failure to provide information or consult affected persons, as well as activities that displace local communities can negatively impact both human rights and environmental protection. Conversely, environmental protection supports human rights through securing sustainable availability of critical natural resources and eco system services (p.20).

Internationally, the Stockholm Declaration of 1972 set out 25 common principles for the preservation and enhancement of the human environment. Principle 1 underlined that "man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of equality that permits a life of dignity and well-being, and he bears solemn responsibility to protect and improve the environment for

present and future generations”(p.10). After the Stockholm declaration, human rights were now considered pre-requisite to effective environmental protection.

In 1992, the United Nations convened a second global conference on the environment at Rio de Janeiro, Brazil. Principle 10 of the Declaration that emerged from the conference stipulates that:

Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities and the opportunity to participate by in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided (p.11).

The above further gives credence to the fact that human rights are inextricably inter-twined with the environment and environmental protection. Giving an additional perspective to the human rights-environment relationship, the International Court of Justice's Judge, Weeremanty in OHCHR and UNEP (2012) stresses that the enjoyment of internationally recognized human rights depends upon environmental protection. He says:

The protection of the environment is... a vital part of contemporary human rights doctrine, for it is a sine qua non for numerous human rights such as the rights to health and the right to life itself. It is scarcely necessary to elaborate on this, as damage to the environment can impair and undermine all the human rights spoken of in the Universal Declaration and other human rights instrument (p.12).

The truth expressed above cannot be improved upon. It is a reflection on the fact that some specific rights are inseparable from environmental quality. The most developed example is the right to water. In 1999, the United Nations General Assembly (UNGA) asserted that the right to food and clean water are fundamental human rights and their promotion constitutes a moral imperative both for national government and for the international community. Moreover OHCHR and UNEP (2012) explain that right to water and portable water and environmental conditions and their influence to the right to health are noted in the committee on Economic, Social and Cultural Rights' General comments Nos. 14 (The right to the highest attainable standard of health, 2000) and 15 (The right to water, 2002). In the general comment 15 of the committee on Economic, Social and Cultural Rights in OHCHR and UNEP (2012) notes:

The human right to water is indispensable for leading a life in human dignity. It is a pre requisite for the realization of other human rights. ...the human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses. An adequate amount of safe water is necessary to prevent death from dehydration, to reduce risk of water-related disease and to provide for consumption, cooking, personal and domestic hygienic requirement.

Closely related to the right to water is the right to health, which also is inextricably linked to the environmental conditions. This truth is seriously recognized in some of the reports of the United Nations, where it has been identified that a fifth of the disease burden in developing countries can be linked to environmental risk factors.

The glaring abuse of the environment through reckless mining undermine the health of the people, ignoring the fact that hazardous substances and wastes in water, air and soil do have serious, negative impacts on public health. The World Health Organization (1946) defines health as a “state of complete physical, mental and social-wellbeing, and not merely the absence of disease or infirmity” (p.100). In the case of Ebonyi State Nigeria, the mining impact on health is quite enormous as had been discussed earlier.

Regrettably, both the people's right to clean, safe, portable water and their right to health are being infringed upon. In fact the contamination of the rivers criss-crossing the mine areas (which hitherto had been the people's main sources of water for diverse purposes) through the Acid Mine Drainage (AMD) and the total pollution of the environment of Ebonyi State in general through unbridled mining are direct attacks, primarily, on the right to life of Ebonyians. The miners should be made to appreciate that the right to life is an imperative and therefore should take priority over and above economic gains and considerations.

### **The Principle of Sustainability and the Impacts of Mining in Ebonyi State, Nigeria.**

Historically, like the principle of human rights, sustainability as a term common to environment and development was adopted at the historic UN Stockholm conference on Environment and Development in 1972. Hence interconnections between environment, development and sustainability were finally brought together under one concept. Again in 1992, the Rio Earth Summit brought the international community together to address global sustainable development challenges including issues such as climate change, health and the environment, biodiversity and poverty alleviation.

Ajash and Vaibhav (2011) in their definition of the term “sustainability” see human activities as part of and dependent upon the natural world. They defined sustainability in terms of meeting basic human needs and wants; making decisions that recognize the connections between actions and effects in the environment, economy and society; and being concerned about the kind of legacy that is left for generations unborn. The United Nations sustainable development platform, Rio+20 raises alarm that the world's population of 7 billion is likely to increase to 9 billion by 2050; the demand for diminishing natural resources (that is non-renewable resources) is growing; and income gaps are widening. Thus, sustainability is seriously linked to basic question of equity- that is fairness, social justice and greater access to a better quality of life. While it is appreciated that the term is widely used in other subjects than the environment, in the context of this paper, sustainability borders on environmental preservation. Ibeh (2000) holds that development economists have adopted the term in an attempt to clarify the desired balance between growth on one hand and environmental preservation on the other hand. Hence, Todaro in Ibeh (2000) joined others afore mentioned to define sustainability as meeting the needs of the present generation without compromising the needs of future generation.

In this line of argument, sustainability therefore recognizes that: the unborn generation sure will also have need for both renewable and non renewable natural resources; they also will have the right to health, will need to live in an unpolluted, toxic-free environment and therefore will need to meet an eco system that will be habitable.



The all important moral questions that the present generation must answer are: is it fair and just to exploit and usurp all the renewable resources without renewing them and the non renewable resources, leaving nothing for the future generation? Is it fair to pollute the eco system and make it inhabitable for them?

Thus for the sake of posterity, the principle of sustainability forbids the miners in Ebonyi State from over-exploiting the non renewable natural resources in the state. It also demands from them a high sense of discipline in mining activities, such that will employ best practices that conform to led down regulations in mining, thereby imbibing the biblical injunction in Genesis 2:15, where man is commanded to “till the ground and keep it”. It is only obedience to the injunction of “tilling and keeping” the ground that will preserve the eco system for future generation.

### Conclusion

The problem of heavy impacts of mining in the environment (Ebonyi State, Nigeria in particular) is hydra headed and not because there are no regulations guiding mining, rather because the people involved lack the character, discipline and moral will to implement and adhere to the regulations. Nnadi in Ocho (2005) maintains that the “greatness of the industrialized and technologically advanced countries do not lie in their sophisticated computers and weaponry but in the mind; the man behind the machines: his character, morality, self-discipline, submission to the rule of law...” (p. 85). In the same vein, Agha in Nkama (2010) quips that “Morality moulds a good man and the good man moulds the nation and society” (p. 97).

Nnadi's position above has a wider application. In this subject, the men directly behind the machine are those doing the mining. The moral/ethical part of the exercise (mining) should be most important to the miners. However, the inability of the miners to play by the rule in Ebonyi State which in turn results in environmental degradation eloquently testifies that they value the wealth more than the life of their host community, where as life is of the highest value. This calls for their value re-orientation. Since it is an established fact that good procedures in mining though more expensive, reduce heavy impacts on the environment to the barest minimum and these procedures/regulations are available and known by the operators, the other set of men behind the machine are the enforcement agencies. Here in Nigeria, we have the National Environmental Standards and Regulation Enforcement Agency (NESREA), Federal Ministry of Environment, et cetera which all have state offices in Ebonyi. They are charged with the responsibility of ensuring that miners, both expatriate and local, conform to standards and are sanctioned if non-compliant. Studies have shown that miners in Ebonyi State flagrantly abuse the rules, implying that more concerted efforts of NESREA and Ministry of Environment are urgently needed.

The research also indicates the ignorance of the people in Ebonyi State of;

- i. Mining and Quarrying regulations;
- ii. Their obligation in reporting to relevant Agencies; and
- iii. The danger people living in mine areas are exposed to. These have contributed to the negative impacts of mining in the state. There is therefore an urgent need for sensitization and proper education of people living in mine areas in particular and the people of Ebonyi State, Nigeria in general.

### Suggestions

From the observations of the research summarized above, the following are the suggestions of this research:

- i. Value re-orientation: Miners need to be re-orientated so as to be able to reshape their values in the mining operation. Such will help them define and assess their motive in their operation which should not solely aim at exploiting the natural resources and making all the gains by boycotting the standards in order to minimize costs. Thus, at the preliminary stage, the Ministry of Environment both State and Federal should organize an orientation and interactive session for any company that wishes to operate. This will achieve sustainability in the mining operation, where the future generation will come and meet the environment still habitable. As such, both the state and Federal Ministry of Environment should re-orientate miners and mining companies on the tenets and demands of justice, human rights and sustainability as they tap the resources.
- ii. Government of Ebonyi State should diversify the economy of the state by building more industries taking Agriculture in the from more subsistence farming to commercial agriculture. This will reduce interest from artisanal mining which gives quick/cheap money, and cause Ebonyians to refocus on Agriculture.
- iii. The artisanal miners in the State should be group together by the government ministry of commerce industry into societies for easy monitory and training. When they are trained on the best practices in mining, the negative impacts would have been ameliorated.
- iv. NESREA Ebonyi State office should enforce the closure of all abandoned mines in the State to check Acid Mine Drainage for example some artisanal mines at Ishiagu Enyigba in Abakaliki, Ameri and so on.
- v. NESREA and other environmental enforcement agencies should re-strategize and brainstorm on how best to achieve their goals. They also need to establish in house mechanisms to checkmate fraud amongst their staff. This will ensure that no one places personal interest in pecuniary benefits above statutory and legitimate responsibilities.
- vi. The host State Ministry of Environment and NESREA as well as National Orientation Agency have roles to play in educating and sensitizing the communities in mine areas of:
  - a. The content of the Regulations on Mining and general environmental regulations.
  - b. Their obligation in reporting to appropriate Agencies of any contrary practice in the operations of the miners in their area. This will help the enforcement Agency to be more efficient. They should be made to understand that they and their generation unborn have the right to a healthy and unpolluted environment.
  - c. The health dangers they face as people living in mine areas if they sit on the fence. This will motivate them to cooperate and partner with government agencies in the business of environmental safeguards.

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### Guideline for Oral Interview

#### Category A: Miners Mining Company

1. When did you start the mining operation in this village?

(i) What is the greatest depth you have mined so far?

(ii) Would you classify your operation as surface or underground mining?

2. How has your mining operator benefited host community?

3. Since you started the operation, what negative impacts have you identified to affect the community?

4. What factors do you think are responsible for the negative impacts of your mining activities in the community?

5. What measures do you think can be taken to ameliorate the negative impacts of your operation in the community?

1. **Category B:** Villagers in mining communities. When did mining operation in your village begin?

2. Do you also engage in artisanal Mining?

3. What negative impacts have you identified in your community since mining began?

4. How has mining helped to improve your life and community?

**Category C:** NESREA, State Ministry of Environment; and Ministry of commerce and Industry.

1. How many Mining/Quarry sites do we have in Ebonyi State?

2. What are the negative environmental impacts of mining in Ebonyi State?

3. How has mining operations improved the economics of the State?

4. What are the standards and Regulations in mining/Quarrying?

5. To what extent do Mining/ Quarrying industries comply to regulatory standards?

6. What are some of the factors to which your Agency can attribute the negative impacts of mining in Ebonyi State?

5. What measures could be taken to ameliorate if not eradicate the negative impacts of mining in Ebonyi State

### Oral Participatory Interview

S/N	Name of Interviewee	Sex	Occupation Address	Age	Date	Interviewer
1	Chukwu N. Ifeanyi	M	Civil Servant Ogwor	+35	18/6/15	Nkama Chinyere Lilian.
2	David Nwokporo	M	Artisanal Miner Ameka (Ihotor)	+33	30/05/15	Nkama Chinyere Lilian.
3	Deacon Njoku Leary	M	Operator Manager crushed Rock Ishiagu	+41	18/06/15	Nkama Chinyere Lilian.
4	Ebere Eze	F	Nurse Ishiagu Enyigba	+30	30/05/15	Nkama Chinyere Lilian.
5	Ekpe, Samuel Nwangbo	M	Civil Servant Ebonyi State Ministry of Commerce and Industry.	+50	14/11/14	Nkama Chinyere Lilian.
6	Elder Paulinus	M	Community Chairman Ihetutu Isiagu, Ebonyi State.	+66	18/06/15	Nkama Chinyere Lilian.
7	Eme Okoro	M	Civil Servant Abakaliki	+45	14/01/15	Nkama Chinyere Lilian.
8	Ikenna Austin	M	Artisanal Miner Ameka (Ihotor)	+30	30/05/15	Nkama Chinyere Lilian.
9	John Emmanuel	M	Private Investor Abakaliki	+48	30/05/15	Nkama Chinyere Lilian.
10	Mbam, Darlington.	M	Civil Servant. Ebonyi State Ministry of Works Transport Admin. Department HOD.	+45	20/11/15	Nkama Chinyere Lilian.
11	Nathaniel Godwin Doeko'os	M	NESREA Ebonyi State Office (Desk Officer, Mining)	+38	14/01/15	Nkama Chinyere Lilian.
12	Nicodemu Agbalu	M	Artisanal Miner Ameka (Ihotor)	+35	30/05/15	Nkama Chinyere Lilian.
13	Nwafor Julius	M	Civil Servant Ihotor Community Ameka, Ezza	+29	30/05/15	Nkama Chinyere Lilian.
14	Nwali Sunday Paul	M	Artisanal Miner Ameka (Ihotor)	+36	30/05/15	Nkama Chinyere Lilian.
15	Nworie Elijah	M	Ikwo, Ebonyi State (Civil Servant)	+30	05/02/14	Nkama Chinyere Lilian.
16	Okeh Sunday	M	Artisanal Miner Ohankwu Ikwo	+27	30/05/15	Nkama Chinyere Lilian.
17	Oketa Friday	M	Artisanal Miner before Plumber	+45	30/05/15	Nkama Chinyere Lilian.
18	Opeke Echee	M	Artisanal Miner (Pit owner) Enyimchukwu-Ndufu-Alike Ikwo.	+50	31/07/15	Nworie Elijah
19	Pele Egbagiri	M	NESREA Ebonyi State Office (State Coordinator)	+42	14/01/15	Nkama Chinyere Lilian.