2nd International Engineering Conference (IEC 2017)
Federal University of Technology, Minna, Nigeria

Sustainable Minerals Exploitation as a Panacea for Rapid Economic Growth in Nigeria

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ABSTRACT
The over dependence on the oil and gas sector in Nigeria and the current decline in the world oil market calls for the diversification of the National Economy in the areas of solid minerals exploitation. This paper identifies the solid mineral potentials of the country and pin points on the use of solid mineral potentials as a means of diversification of the national economy, a means of wealth creation and improvement of the standard of living. This paper also reviewed from different literature the contribution of the solid mineral sector to the development of various countries. It showed that solid minerals contributed 24% to the gross national product of Botswana , 14% to the gross national product of United State of America 18% to the Gross National Product of South Africa and also 14.4% of Gross Domestic Product of Ghana. These are few countries that have their economy boosted by the major contribution of mining sector to their Gross Domestic product. All these are well above the contribution of solid minerals to the GDP of Nigeria which stands at 0.3%. The mineral potentials of Nigeria, if adequately exploited, can launch the country into a realm of national financial sufficiency and also in the development of indigenous products that can be consumed and exported to generate revenue for the country.

Keywords: National Economy, Solid Mineral Exploitation, Solid Minerals Potential, Sustainable Mineral Exploitation

1 INTRODUCTION

Solid mineral resources are geological bodies that have the potential to be economically exploited. They have been and will continue to be important inputs in most sectors of human endeavor (Carvalho *et al.*,2016).

Nigeria which is richly endowed with solid mineral resources has failed to take its full advantage. For few decades now, Nigeria has been dependent on a source of revenue which is the crude oil. The falling price and the fall in the quantity of demand have left the economy dwindling. According to the BBC news 2015, January 11, it was stated that for about three and a half years from January 2011, the price of crude oil remained in the range from $90 to $120 per barrel. As a result of the increase in oil production in the US and decline in the emerging countries in the middle of 2014, there was a sharp decline in the oil price. Ambrose, 2015 noted that crude oil price went below $30 in February 2016, a drop of almost 75%. Some analysts also speculate a further drop in price to as low as $18 per barrel (Kilduff, 2016).

However, this accounts for the economic challenge that Nigeria is currently facing and calls for an urgent look in the direction of other sectors for a diversified economy. The mining industry in Nigeria which have the potential of creating a sustainable economy have not been fully taken advantage of for economic development and accounts for only 0.3% of the country's GDP. The under development in the mining industry has led to the importation of minerals that could be locally produced of which a typical example is the case of steel.

According to the Ministry of Solid Minerals Development (2016), it was stated that Nigeria in the 1940s was the major producer of tin, columbite and coal. Statistical records reveal that prior to crude oil boom, agriculture and solid mineral exploitation such as tin and columbite, coal and gold sustained the Nigerian economy. For example locally mined coal was sufficient for the railway system and electricity supply while tin and columbite provided bountiful foreign exchange earnings for the nation. In addition, extraction of these minerals also provided employment opportunities.

The Nigerian civil war in the late 1960s led to many expatriates in the mining sector to leave the country. In spite of the large mineral base of the nation (over 44 solid minerals distributed in the 36 states of the federation), as it stands, Nigeria does not even have a place in the top 10 mineral producing countries in Africa which have become rich as a result of their solid minerals exploitation with South Africa topping the list in their diamond and gold exploitation.

2.0 SOME MINERALS FOUND IN NIGERIA AND THEIR LOCATIONS (SOURCE: MINISTRY OF MINES AND STEEL DEVELOPMENT)

a) IRON ORE: Record reveals that Nigeria has large quantity of iron ore and its reserve ranks 12th highest in the world. Kogi, Enugu, niger, zamfara and Kaduna states contribute to about three (3) billion tones of the deposit in Nigeria. The purest of the deposit is found in Itakpe

b) **GOLD:** There are established facts of reserves of both alluvial and primary deposits of gold in exploitable quantities spread across several parts of suprascrustal (schist) belts -in Maru, Anka, Malele, Tsohon Birnin, Gwari-kwaga, Gurmana, Bin Yauri, Okolom-Dogondaji and Iperindo areas - in the northwest and southwest of Nigeria. There are also a number of smaller occurrences beyond these major areas.

c) **BITUMEN:** Bitumen deposits in Nigeria is indicated at about 42 billion tonnes. This occurrence is almost twice as much as the amount of existing reserves of crude petroleum. When fully developed, the industry will no doubt meet local requirements for road construction and also become a foreign exchange earner for the country.

d) **LEAD/ZINC:** there is an estimated 10 million tonnes of zinc deposited in about eight states in Nigeria. Joint venture partners are encouraged to develop and exploit the various lead/zinc deposits all over the country.

e) **BARYTE AND BENTONITE:** The Nigerian baryte had specific gravity of about 4.3. Over two million {2,000,000} metric tonnes of barite ore scattered in different parts of the country; most of these are in Benue, Nassarrawa, Plateau and Cross River States. Similarly, over 7.5 million tons of baryte have been identified in Taraba and Bauchi States. Large bentonite reserves of 700 million tonnes are available in many States of the Federation and are available for massive development and exploitation.

f) **COAL:** Nigerian Coal is one of the most bituminous in the world owing to its low sulfur and ash content, as well as, environmental friendly. There are nearly 3billion tonnes of indicated reserves in 17 identified coalfields and over 600 million tonnes of proven reserves. In short, there is an abundant coal deposit in the country to power the coal-power plants that can contribute up to 30 per cent to the nation's power generation by year 2020.

g) **LIMESTONE:** Limestone occurrences are reported in almost all the 36 States of the Federation with extensive deposits in Sokoto, Gombe, Benue, Kogi, Edo, Oyo, Ogun and Cross River States These deposits are supporting active lime and cement plants in the country. The resource base of the known limestone deposits is about 2.3 trillion metric tonnes with 568 million tonnes of proven reserves.

As at year 2014, cement production capacity of the country was between an estimated 26 million tonnes and 28 million tonnes per annum, given that all the cement plants are operating at their full capacities. The domestic demand totals between an estimated 18.3 million metric tonnes and 20 million metric tonnes per year.

The massive infrastructural development is capable of increasing the demand for cement to 25 million metric tonnes (MMT) annually over the next five years. Investors have a very lucrative opportunity by taking advantage of these deposits to set up cement factories in different parts of the country to meet domestic demand and export to the sub-region.

h) **ROCK SALT**:A total reserve of 1.5 billion tonnes has been indicated, and further investigations are now being carried out to ascertain the quantum of reserves. There are salt springs at Awe (Plateau State), Abakaliki (Ebonyi State) and Uburu (Imo State), while rock salt is available in Benue State.

i) **GYPSUM**: Gypsum is an important input for the production of cement. It is used for the production of Plaster of Paris (P.O.P) and classroom chalk, etc. Large-scale mining of gypsum used in the cement industries is urgently required to sustain existing plants and meet future expansion. Current production is put at 8 million tonnes per annum while the national requirement is 9.6 million tonnes. About one billion tonnes of gypsum deposits are spread over many States in Nigeria.

j) **GEMSTONES:** Some gemstones including Sapphire, Ruby, Aquamarine, Emerald, Tourmaline, Topaz, Garnet, Amethyst, Zircon and Flourspar which are among the world's best are found Plateau, Kaduna and Bauchi States. Good prospects exist in this area for viable investments.

k) **KAOLIN**: This is one of the industrial minerals that can be found in commercial quantity in Nigeria. An estimated reserve of 3 billion tonnes of kaolin deposit has been identified in Ogun, Edo, Plateau and Nasarawa States.

Owing to the large application of kaolin, the market for kaolin is large and expanding. In other to stimulate local growth of the commodity within the country, importation of kaolin is highly discouraged.

l) **TANTALITE**: this mineral is found in commercial quantity in the following states in Nigeria; Nasarawa, Gombe and Kogi States as well as the Federal Capital Territory (FCT). The deposits are both alluvial and primary in the numerous pegmatite bodies that infest these areas. In short, grades of well over 50% Tantalum Oxide (Ta_2O_5) are found in the identified locations in Nigeria.

J) NICKEL: recently nickel had been discovered in Kaduna state of Nigeria. One which is regarded as world class (Ben, 2016). It was also mentioned that the nickel balls rumored to grade better than 90% nickel.

The extraction of renewable and non-renewable resource is relevant for economic growth and essential for the rating of the standard of living of all people. Before the oil boom in the mid 1970's, the solid minerals sector contributed about 10% to the nations GDP and was

ranked second only to agriculture. Recent economic research findings indicates that earnings from solid mineral contribute a handsome share of the gross domestic product (GDP) of such countries as Ghana, South Africa, Australia, Canada, the USA among others (Ozah *et al.*, 2010). It was also mentioned that the Nigerian situation is a pitiful site where the government cannot take full advantage for exploitation of these abundant resources in Nigeria. As a result, the government of Nigeria over the few years have put up strategies to ensure the mining sector thrives Principal amongst these recent initiatives has been the enactment of the Minerals and Mining Act of 2007 which marked a watershed moment in the solid minerals development in Nigeria. Omeye *et al*., 2015 also stated that the passive activity in the mining sector and inefficient mining regulations in Nigeria if properly addressed will add to the GDP and as well serve as a source of employment to the teeming youths.

Sustainability is another problem poised with the solid mineral exploitation in Nigeria. (Brussee, 2015), explained that 'Sustainable Development' is a concept that has developed into a central concept in international law during the last forty years. He added that the most popular definition used for sustainable development, was formulated by the so-called Brundtland Commission in 1987 as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." He also said that Sustainable development is recognising the relation between development and environment, and tries to facilitate the development of people without the destruction of the sources vital to this development.

3.0 METHODOLOGY

The methodology adopted is an extensive review of different literature on sustainable solid minerals exploitation.

3.1 CHALLENGES FACING SOLID MINERAL EXPLOITATION IN NIGERIA

Gyang *et al.*, (2010) pointed out that the exploitation is done by informal and in most cases illegal miners using very crude techniques with no consideration for the environment or human health.

They further outlined the following as the problems facing solid mineral exploitation; which include policy inconsistency and lack of adequate legislation, high risk and health hazards, weak regulation, lack of well-equipped laboratories, unwholesome practices of stakeholders and inadequate number of trained personnel, access to capital, lack of appropriate technology and machinery, and environmental degradation and pollution. These are discussed in the following section.

3.1.1 Policy inconsistency and lack of adequate legislation: Government policies in the Mineral sector over the years tend to be unstable as they come and go with the government of the day. For example, the remarks in 2008 by the Minister for Mines and Steel Development to revoke and revalidate all exploration licenses (ELS) issued by the mining cadastre office are one such instance. Such developments scare away operators and prospective investors due to uncertainty. Similarly, the minerals act of 1999 failed to cater for certain critical aspects of the solid minerals sector and left a lot of room for undue bureaucracy in mineral title administration. It is hoped that the new minerals act signed into law in 2007 will ensure security of tenure; greater transparency in granting access, competitive fiscal terms and encourage an industry led by the private sector.

3.1.2 High risk and health hazard: Because the mineral Sector in Nigeria is mainly driven by the artisanal and small scale miners who embark on low technology and crude/traditional methods in their activities, they are exposed to high risk from obnoxious and dangerous metals such as lead and radio- active waste. Manganese value of 0.9mg/l which is higher than the World health Organisation highest desirable level of 0.05 has been recorded in abandoned mine ponds of the Jos Plateau, while chromium values of 0.1mg/l and 0.12mg/l which exceeds the maximum admissible concentration of 0.05mg/l were also recorded. Similarly, mining methods like lottoing has resulted in several deaths as a result of collapse or accidental falling of human beings and animals into abandon lotto's.

3.1.3 Weak Regulation: Activities of the artisanal and small scale miners are proving difficult to curtail by legislation, and Ministry professionals saddled with the responsibility of monitoring their sharp practices are poorly equipped to face the menace. Often times, these operators are armed and desperate. Weakness of the regulations is said to be as a result of the Governments consciousness of the need to allow locals earn their living wages through small scale exploitation of minerals to alleviate poverty.

3.1.4 Lack of well-equipped laboratories: There is an apparent lack of well-equipped laboratories for conducting test on mineral raw materials, and where they exist, their equipment are often old and outdated, while the few modern and high tech equipment laboratory that exist either lack adequately trained personnel to operate them, or are saddled with problems of inadequate supply and fluctuating electricity levels which sometimes destroy these equipment. Mineral samples are often taken overseas for reliable results.

3.1.5Unwholesome Practices of Stakeholders: Most gem stone producing mines are artisanal in nature and Won stones are not declared but are hidden to avoid

royalty. Such stones are smuggled out of the country to international markets without any value addition, and as such are valued lowly resulting in loses of lots of revenue by the Government and even the marketers themselves.

3.1.6 Access to capital: Access to necessary capital and finance is a big problem to many miners, especially the small scale and artisanal miners. The conditions required for the issuance of loans by banks and the interest rates normally scares away the miners as their conditions are harsh. It is hoped that the effort by the Federal government of Nigeria and the World Bank to give out funds to the tune of US$120 million to artisanal and small scale miners as a poverty alleviation strategy will address this issue.

3.1.7 Lack of appropriate Technology and Machinery: Artisanal and small scale miners form the bulk of the players in the minerals industry in Nigeria, and they lack sufficient capital to purchase or hire technology and appropriate machinery. This has resulted in the use of crude technology resulting in devastating effect on the environment and even the quality of minerals mined.

3.1.8 Environmental Degradation and Pollution: Mining of minerals in Nigeria has always left behind a devastating effect on the environment. On the Jos Plateau, where active mining of tin and columbite took place, a post mining environment scarred by numerous mine pond sand dams surrounded by heaps of mine spoils and devastated landscape was left behind with a total of 2,015disturbances recorded in the form of mine ponds, mine dumps, and lotto's in just 3 of the regions where mining took place, and 75 deaths recorded in abandoned mine ponds within the period 1994 to 2008 (Gyang, 2010). Damage to sensitive ecosystems that support fish and wild life, and human health risk from contaminated water sources are a common occurrence as witnessed in Zamfara, North Eastern Nigeria where about 300 people died as a result of lead poisoning of shallow water sources and soils due to gold and lead mining activities. Similarly, it is on record that in 2005, about 1.0 billion tons of iron ore, bauxite, arsenic, cadmium, copper, gold, lead, mercury and nickel produced yielded more than 4.0 billion tons of waste material. This is four times more than ore extracted.

3.2 SUSTAINABLE SOLID MINERAL EXPLOITATION

According to Franceschi and Khan (1999), the generally accepted definitions of sustainability require the current generation to satisfy their needs without reducing the prospects for future generations.

Mining processes have long been thought to be very harmful to the environment and generally not sustainable in the long run. Much of this mind set is due to a history of inhospitable mining operations around the world, Corraza (1999). In the past, not unlike other industries, the mining industry has used little caution with regard to the land and forest that was cleared for construction, the water that was used in the production process and disposed of without treatment, the air pollution that was emitted, and the tailings and leachates which released harmful toxins into the earth. But this history of degradation and depletion need not define the role of mining in terms of sustainability for the present and the future. Economic reliance on exhaustible resources does not necessarily mean an unsustainable growth path. Typically mining profits are thought to be relevant over the time horizon of the mining project, then disappear as quickly as the deposit itself. It is not a necessity that short term gains are the only contribution of mining to the economy, a broader view of this relationship may provide a more optimistic view. The revenue received in the current period from mining operations is substantial. The forecasted potential revenues from mining in the near future are considerably high as well. High earnings today, if used wisely, can help offset reliance on other economic activities that are less sustainable than mining (Corraza, 1999).

Gyang *et al*., (2010) noted that solid mineral exploitation in Nigeria is done by informal and artisanal miners who lack the appropriate technology and funds to carry out the exploitation in a sustainable manner. As result, they leave behind a devastated landscape which adversely affects the various environmental media and its resources like water, soil and food crops thus endangering humans and wild life.

The Mining Industry is now a global industry with many countries competing for exploration funds. The fierce international competition suggests that mining companies and their investment funds would only go to those countries where the enabling environment would allow the private sector to flourish without hindrance. As a result of this, the government have put a lot of efforts towards a sustainable mineral exploitation in the country.

3.3 ECONOMIC IMPORTANCE OF SOME MINERALS FOUND IN COMMERCIAL QUANTITY IN NIGERIA.

3.3.1 IRON ORE: One of the widely used materials in the world today is steel. The use of steel is diverse. Steel uses ranges from industrial to domestic application. Steel is an important material in the building of infrastructures and widely used in the construction industry. According to ...., iron and steel are the key products for the global economy. Since 2000, global steel production has grown by 75% reaching 1.49 billon tons. The increasing demand for housing and other infrastructure globally indicates that steel will continually be on a high demand. According to the ministry of mining and steel in Nigeria it is recorded that Nigeria has a large deposit of the iron ore which is

about the 12th largest in the world. Inspite of this the yearly import of steel products into the country was estimated to about $3.2 billion annually (daily trust 2014, October 13). Iron mining in Minnesota helped contribute more than $3 billion to the state economy in 2010 and provided about 11,200 jobs (source: university of Minnesota Duluth Labovitz School of Business and Economics). For a self-sufficient economy it is important look in the direction of iron and steel industry.

3.3.2 GOLD: Gold is a very precious metal which for long has had very intimate relationship with mankind. Gold have been identified in some areas in Nigeria in commercial quantity. Research findings by PwC (formerly PriceWaterhouseCoopers) revealed that the supply and demand for gold makes a positive impact on the overall growth of the global economy. it was noted that in 2012, at least US$210 billon of value was created by the gold industry and added to global Gross Domestic Product. Their research findings indicated that in 2012, gold mining contributed over US$78 billion to the economies of the top 15 mining countries. These countries include Ghana, South Africa, Australia and Pery. Gold mining has a great impact on the growth and wealth creation of developing countries; greatest in Papua New Guinea (15% of GDP) then Ghana (8% of GDP) and Tanzania (6% of GDP). for these countries, gold is a major source of export and foreign revenue. The research also revealed that the mining sector is responsible for great employment opportunities. Providing about 146,000 jobs in south Africa alone. This is even more pronounced when indirect jobs and dependency ratio are taken into account.

3.3.3 Tantalite: Tantalite is a mineral which the metal tin is extracted from. About 14,000 tonnes is found in plateau state alone. It has applications in the forming of alloys useful in aerospace, gas turbine engineering. It is non-irritant to the body and hence can be used in surgical steel. According to the report titled (tantalite export in Nigeria, Report Code: Fora/08/2011/040), Large deposits are found in Kogi, Gombe and the Federal Capital Territory. It was also noted that the return of investment on the exportation of tantalite is between 10-15%

3.3.4 kaolin: Kaolin in Nigeria is located in abundance all over Nigeria, but not in quantity enough for modern industrial use. We have the deposit in Abak, Akwa-Ibom, Uruove near Ughelli in Delta State, Ifon in Ondo State,Mokola in Oyo State, Sokoto in Sokoto State, Gombe in Gombe State, Dangara in Niger State, Umuahia in Abia State, Onitsha in Anambra State, Kutigi in Niger state (Akkhirevbulu *et al.*, 2010). The world ranked Iraq as the 11th in the country that has one of the highest kaolin deposit in the world in the year 2011, (about 1,200mt of kaolin), and it has increased the gross domestic product by 0.8%.

3.3.5 Bitumen: In world, Nigeria is the 6th Country that has the largest bitumen deposit, and Ondo State has the largest reserve (Dailytimes, 21 January, 2016). The Nigerian Bitumen deposit is about 42.74 Billion metric tons, In the year 2009, the Gross Domestic Product of Albania increased by 33%, through the production of Bitumen (The National Economy, 2009).

3.3.6 Coal: coal has real economic value. it is surprising to know that in South Africa, coal has more economic value to Gold (Stat SA, 2014) the paper revealed that in 2013, coal contributed R21 billion to the south African economy compared to gold's R21 billion. The paper also stated that coal is a great source of wealth to the nation contributing 27% of mineral sales in 2014. According to the statistics, coal mining created 91, 605 employment making it an important employer of labor. Coal is an important mineral with diverse uses viz; power generation, employed as fuel in steel production. It is also used in chemical and pharmaceutical industries.

3.3.7 Gypsum: gypsum is an important mineral which is a raw material input for the production of cement. Cement is used mostly in the construction industry. Currently research shows that concrete roads are more durable than asphalt roads and offers other advantages such as greener construction process, resistant to extreme weather. Hence demand for cement may soar high in the nearest future. Currently, production in Nigeria is put at 8 million tonnes per annum while the national requirement is 9.6 million tonnes. About one billion tonnes of gypsum deposits are spread over many States in Nigeria. A country which is richly endowed with such mineral should utilize this advantage for economic development. Another important use of gypsum is in the production of plaster of Paris (P.O.P).

3.3.8 Gemstone: According to The Economics, (2005), Madagascar has the 4th largest deposit of Sapphire, and it was estimated that Sapphire mining accounted for 3% of the GDP and 1% of its export revenues. The mining industry in Sierra-Leone also contributed 4.5% to the GDP in 2007, through the mining of Gemstones (African Development Bank, 2009)

3.4 CONTRIBUTION OF MINERAL RESOURCES TO THE GDP AND NATURAL RESOURCES ACCOUNT

Ladan (2014) noted that solid minerals production increased in 2008, relative to the preceding year. Provisional data showed that aggregate output increased from 35.6 million tonnes in 2007 to 40.2 million tonnes. He explained that the development was accounted for by the substantial increase in the production of all the principal minerals, especially stone aggregates, limestone, sand, marble aggregates, gold and lead/zinc. The production of stone aggregates was 3.6 million tonnes as

against 2.9 million tonnes in 2007. The production of limestone, sand, marble aggregates, lead/zinc and gold increased by 19.2, 13.8, 12.6, 10.7 and 11.1 per cent, respectively. The production of barite, cassiterite, iron ore, shale columbite, clay and laterite also increased in 2008. The commencement of gold mining by a Chinese company in Osun State, with an investment of N1.0 billion (US$7.7 million), added to the growth in gold production.

3.5 BUSINESS PROSPECTS IN THE SOLID MINERALS SECTOR.

The solid minerals sector sees a lot of business opportunities as the sector is wide and depends on other sectors for its survival. These business prospects offer a lot of opportunities for those willing to take advantage.

A few business opportunities associated with the mining sector are

3.5.1 Mining Consultancy: Every industry needs a consultant who could offer advice, directions or suggestions to help the industry move forward.

3.5.2 Transportation service: After mining, these items need to be transported to places where they would be refined or used. You could build a haulage business that focuses on helping investors in the mining industry transport their goods safely.

3.5.3. Financial consultancy services: You could also become a financial consultant to people in the mining business. You would help them secure funding, help them with tax issues and anything that has to do with the financial aspect of the business.

3.5.4 Machine sales: Another business idea is to start selling equipment to people who are already in the mining business. Equipment used for mining is generally expensive, so you must be ready to invest a lot of capital in this business.

3.5.5. Equipment leasing: Not everyone in the mining industry can afford to buy all of the equipment that they need. You could purchase these equipment's and rent them out to other people for a fee.

3.5.6 Power supply: You could also start a business of selling generators or constructing alternative energy sources like solar energy or wind energy to people in the mining industry in order to help them cut power costs.

3.5.7 Safety services: Mining is a risky business. There are a lot of things that could go wrong if proper safety precautions are not taken which is why safety services are always needed in the mining industry. You could start a safety consultancy business which provides safety services in the mining industry.

4.0 CONCLUSION AND RECOMMENDATION

Nigeria is endowed with diverse mineral resources of very good grade and substantially large quantities which if properly harnessed would sustain industrial and technological development as well as earn foreign exchange and create job directly or indirectly. Indirect jobs provided are services like haulage, equipment hire, mining consultancy etc. Though the mining industry is faced with challenges such as access to capital, lack of appropriate technology, power, supply, security etc. The central government is vested with the powers of implementing policies and legislations, need to be consistent and ensure that these policies are sustainable in order to attract foreign investors. The activities of the artisanal and small scale miners who presently dominate the solid minerals industry use crude and unconventional methods to extract the mineral resources with severe consequence on the environment and pollution of water sources and soils, resulting in several deaths. Furthermore, since their activities are usually unchecked, the illegally acquired solid minerals find their way into international market, this leads to loss of revenue to the government. The mining sector if properly managed has a lot of business prospects which can lead to job creation and improve standard of living of the citizens

REFERENCES

African Development Bank, OECD- Organisation for Economic Co-operation and Development (2009): Country Note Volume One and Two. OECD Publishing.

Akkhirevbulu O.E., Amadasun, C.V.O., Ogunbanjo M.I., and Ujuanbi O.. The Geology and Mineral Clay Occurrence Around Kutigi Central Bida Basin. Euthopian Journal of Environmental Studies and Management. Vol.3 No.3 2010

Ambrose E.P. (2015, December 2015). "Goldman Eyes $20 Oil as Glut Overwhelms Storage Sites" The Telegragh. Retrieved 29 December, 2015.

BCC News – Egypt Unrest Pushes Brent crude Oil to $100 Per Barrel. BCC news Jan 31, 2011. Retrieved Jan 5, 2015.

Ben, E. 2016 august 29 " world class nickel discovered in Nigeria, govt. to sign exploration deal with austrelian firm. Premium times.

Botswana Daily News, 9th march 2016

Brussee O. (2015). Public Participation in Mineral Resource Exploitation Under international Law On Sustainable Development.

Carel Smit, (2017) The Role Of Mining in South African Economy.

Carvalho J. M. F., Meira J., Marques C., Machado S., Mergulhão L.M. and Cancela J.(2016) Sustainable Exploitation of Mineral Resources Within an Area of the Natura 2000 Network

Corraza .G, (1999) The Economic Implications for Sustainable Mining within the Paradigm of Sustainable Development

Franceschi, Dina and Khan, James R., 'The Economic implication for Sustainable Minning.' Analise Economica 17.31 (1999): 141-154.

Gyang, J.D., Nanle, N. and Chollom, S.G, (2010). An Overview of Mineral Resources Development in Nigeria: Problems and prospects. Continental Journal of Sustainable Development 1: 23 - 31, 2010.

John Kilduff. (2016) Calling a bottom for Oil?, Not so fast: http://www.cnbn.com Friday, 11th March 2016.

Ladan M. T. (2014). Mineral Resources Law and Policy in Nigeria

Ministry of Solid Minerals Development (2016). Economic Diversification- A long Overdue National Priority

Omeye, L., Ugwuanyi, O.D., Kennedy, O., Abudulrahman, A.S. (2015) Economic Benefits of Aluminium Ores Deposit in Nigeria as Alternative source of foreign Earning. Presented at International Engineering Conference, Federal University of Technology. Minna, 2015.

Ozah, A. P., Wever T., Ghys, L., Weissmann .T, (2010). Prospects, challenges and strategies in the implementation of the Nigerian computerized Mining information system.

Statisics South Africa (2014). www.statssa.gov.za

The Economist, 2005. Getting Stone; Madagascar 30 July 376(8437): 42 US. Page 42.

The National Economy, 2009.Eastern Europe Countries Mineral Industries Handbook. Vol.1.