
Perception of Safety and Security of Economy of Africa: Shortfalls in Solid Mineral Exploitation in Contemporary Nigeria

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Abstract

Nigeria is one of those countries that possess vast reserves of solid mineral resources, which face serious challenges. The country continued to earn poor revenue from the solid mineral development that abound. Out of the wide range of energy and mineral resources only petroleum has been substantially developed to finance the solid mineral sector. The best way to tackle these challenges is by formulating an effective legislation, sustainable exploitation, adequate funding, deter public officers from practicing capital flight, and many more. This paper discusses the present situation of undue emphasis on this sectorally growth strategy and the serious relegation of spatial dimension of mineral development efforts. The Methodology used for the study includes primary data, which was mainly field interviews, visits, photographs and questionnaire administration. The secondary data gathered were past related literatures. It is found that, although there are many mineral commodities in almost about 450 Local Governments in Nigeria that are viable and are in economic quantity but not many of them are currently exploited. It is recommended that an official mineral policy be enacted to give the deposits more attention towards their development for using them as raw materials in industries and for export with some level of value addition.

Keywords: Solid Minerals, Nigeria, Government, Legislation and policy

Background to the Study

The Nigeria's mineral sector can, under no doubt improve its contribution to the gross domestic product (GDP) because it has abundant mineral endowments that can even compete favorably with the South African mining sector which contributes 18.7% to its over 365 US dollars. Recently, stakeholders in the Federal government reiterated that the sector must aspire to contribute between 5-10% to the GDP (BOI, 2015; Table 3) To date, about 44 solid mineral commodities occurring in about 450 locations have been identified in Nigeria and they are at various stages of explorations and exploitations (FMMSD, 2015). Fortunately, these minerals are distributed in almost all the states of the federation. The mineral commodities can be divided into 6 major groups, namely: metallic minerals, precious minerals, gemstone, specialty minerals, mineral fuels and industrial minerals (Rahman, 2003; NIMAMOP, 2009).

- a. Metallic Minerals: This group includes minerals such as
 - i. Cassiterite (tin ore) Nigeria was one of the leading World's producers of tin ore but production has reduced to only a fraction of what it was.
 - ii. Lead/zinc ores
 - iii. Iron ores
 - iv. Bauxite (Aluminum)
 - v. Nickel
 - vi. Chromium
- b. Precious Minerals: Gold (see plate i), silver, cadmium
- c. Gemstone: Aquamarine, Emerald, Ruby, Amethyst, Beryl, sapphire, Tourmaline, garnet, zircon.
- d. Specialty Metals: Tantalite, columbite, Lithium, beryllium.
- e. Fuel/energy minerals: Coal, lignite, bitumen (tar sands), uranium, thorium.
- f. Industrial Minerals: This group can be further sub-divided into:
 - i. Chemical subgroup which include salts, sodium, carbonate and sulphate, potash, phosphate, nitrates, sulphur, trona.
 - ii. Metallurgical and refractory subgroup: metallic ores, fluorspar graphite, marble, limestone, dolomite, refractory clays, kyanite, etc
 - iii. Abrasives subgroup: Corundum, quartz sands, diatomite, monazite, etc
 - iv. Other Industrial and manufacturing subgroups: asbestos, mica, talc, monazite, barite, gypsum.
 - v. Dimension stones (see plate h)

The mines and steel sector is important for the diversification of the economy (Wright et al, 1985), but it is usually not funded beyond N3 billion annually, making it to be one of the underfunded sectors in the nation's economy (see table 1). In the year 2014 the mining sector got N500 million as its capital budget.

Study Area and Geology



Figure 1: Map of Nigeria showing major cities



Plate a: Degraded land by artisanal illegal gold miners at Maiwayo, Niger State, 2012

The study area, Nigeria is located in the western part of Africa between latitudes $4^{\circ} 16'N$ and $13^{\circ} 52'N$, and between longitudes $2^{\circ} 49'E$ and $14^{\circ} 37'E$ (KSME, 2010) It occupies a total land area of $923,768\text{km}^2$ which is approximately 356,669 feet, with a population of 147 million citizens, as at 2006 (NPC, 2006) The variable climatic conditions and physical features have endowed the country with a rich biodiversity and renewable energy sources. It is bounded to the north by Niger republic, to the east by Chad, to the west by Benin republic and bounded to the south by Cameroun (Figure 1). Nigeria has a highest point of 2,042 meters (6,699 ft) and a broad coastline of 853km (equivalent to 530 miles) (KSME, 2010)

Nigeria lies in the extensive region east of the West African Craton and northwest of the Congo Craton, which was affected by the Pan African orogeny which took place about 600 million years ago. The surface area of Nigeria or its geological composition is nearly covered in equal proportions by two (2) main groups of crystalline rocks, which are further categorized into Basement complex, the Younger granites of the Jurassic age and the Tertiary- Recent volcanic, which are the Younger volcanic, and the Sedimentary Basins. The sedimentary rocks are distributed over eleven (11) sedimentary basins (NGSA, 2009; Kankara, 2014).

Empirical Review of Literature

The Challenges for Economic Diversification

Before the euphoria of the oil boom there was no alternative choice but to exploit the rich agricultural, forestry and mineral resources of Nigeria with marked regional roles in the national economy, particularly northern part. Although the fortunes of these resources products and their producing regions fluctuated over time, the relative resilience of the national economy derived essentially from the diversity of the products that sustained it.

The federal government of Nigeria had over the decades put in various laudable endeavors and policies, including the solid mineral development policy of 2007 and the Nigerian Industrial Revolution Plan (NIRP) as a means of creating an investor-friendly environment for players in the sector, but without implementing the policies. The Bureau for Statistics had in the report on the Nigerian mining and quarrying sector released in January 2014 showed that the sector had contributed 0.09% to the GDP within the period (see table 1) As the nation seeks to diversify into non-oil sectors, the Federal Ministry of Industry, Trade and Investment will continue to work with the federal Ministry of Mines and Steel Development to provide the necessary incentives and support the investors in the sector (Azapagic, 2004; FMITI, 2015)

The potential reserves of bitumen far exceed that of oil and gas, and when developed, are bound to be a major player in the economy of Nigeria. The federal government in 1989 instituted a National Committee on the implementation of Bitumen Project (CIBP) with an office in Akure. The committee was dissolved in 1995 and the project is now managed by a team appointed by the Honorable Minister of Solid Mineral's Development. The development of the resource is capital intensive. Current estimates indicate that the establishment of a typical integrated bitumen complex for an average 150,000 synthetic crude capacity per day will cost about 7 billion US dollars.

Uranium occurrence has been investigated around Ugep in Cross Rivers State, and Mika and Ghumchi in Adamawa State. The Nigerian Uranium Mining Company (NUMCO) was set up by government in 1978 but has since been liquidated. The company now exists as a project in the Ministry of Solid Mineral Development.

Again, upon all the industrial minerals that cover wide range of non-metallic minerals used as basic raw materials in variety of industries such as chemical, pharmaceutical, building, ceramic, cement, agricultural, paper, rubber, paint, glass and petroleum only deposits of clay and limestone appear to meet the demand of local industries at the present level of exploration and exploitation. With oil now dominating the economy, not only has diversity been scarified, but also centralized appropriation of revenues has reduced the spatial impacts of resource's exploitation (except the negative factor which is environmental stress)- a situation which gives rise to the sectoral over-emphasis in development planning.

Table 1: Production of Mining and quarrying Industries in Nigeria (Solid minerals only)

Mineral	Unit (s) (Tones)	1995	1996	1997	1998	1999
Limestone	000 MT	3657.0	3206.0	3318.0	3283.0	3423.0
Coal	000 MT	20.0	25.0	21.0	22.0	Nil
Cassiterite	000 MT	0.20	0.23	0.21	0.21	Nil

Source: ECOWAS, Social and Economic Indicators, 2000

Diversification of Economy

Shortfall in the Solid Mineral Development

Non-development of other available resources has placed a definite limitation on the country's financial resources, saddled industries with the problem of raw material shortages and, more importantly postponed the flow of investments and income into the regions, which through the familiar multiplier effect, would tend to expand the internal markets of the nation.

Nigeria will continue to earn poor revenue from the solid minerals that abound in the country. The fact that the solid mineral sector remains grossly underfunded leaves the ministries, departments and agencies of government responsible for effectively monitoring and supervising development in the sector a task they cannot effectively accomplish. Taxes and royalties for mineral exploration go to federal purse rather than states and communities who suffer the many implications (Natsa, 2015). As a result of this, state governors have not been keen to devote their resources to develop mining activities in their states, despite the fact that communities are still counting as more exploration continues to reveal the hidden minerals (Natsa & Olanmu, 2015).

Unfortunately, despite these huge evident resources, the sector remains one of the lowest contributors to the national purse at less than 0.5% of the GDP. Factors hindering development in the nations' minerals and mining sector have been blamed on several factors like illegal mining, environmental and health degradation (plates b & c), poor investment and funding including the allegations that some cabals are behind the mining woes and are currently thwarting the solid mineral sector. Moreover, some delegates of last national constitutional conference revealed that the movement of exploitation of minerals and mining from exclusive to the concurrent list was not recommended in the confab report.

Environmental and Socio-Economic Impacts of Mineral Exploitation

There are quit series of health and environmental risks associated with mineral exploration generally. This risk begins from the exploration stage and continues throughout the lifespan of the mine. The impact may even stretch several years beyond the life span of the mining operation (Garba, 1992). However, the risk associated with

mining operations are numerous starting from the dangerous pits and underground tunnels (lotos) created as a result of this operation which are normally dangerous to humans as well as animals (see plates f & g). These risks could set in during exploration/ mining process when a lot of poisonous metals hosted by the auriferous quartzite are let loose by the laborers (Plate d) (Pegg, 2002). The metals can find their way into our water supply system through gold extraction process or when searching for water for domestic use. Long term effect of mining of most precious minerals includes acid mine drainage which raises the acid level in rivers and streams within the vicinity of the mine thereby posing a lot of health risk to human beings and livestock (plate e). Another way in which mineral processing can have harmful effects on the environment include the use of cyanide in leaching gold from ore which pollutes water and kill humans and fish. The poisoned water when absorbed by plant cells can have a deleterious effect on the food chain with long lasting health repercussions. In remotes areas (villages) land is usually held in high esteem because their major occupation is farming. Anytime gold is discovered, these lands are usually destroyed by the artisanal miners who go about searching for auriferous zones within the area where the initial deposit was first discovered, thus, depriving them access to viable agricultural land and source of livelihood. As a result of the degradation to their land, the youths of the community are forced into artisanal mining business therefore adding to their problems (Weber-Fahr, 2001) Personal field observation shows that prostitution and illicit use of drugs constitute social menaces in mining areas (Kankara, 2015). It was observed that most artisanal miners usually feel that to be active in the pits, there is the need for them to use hard drugs to stimulate their body system and women to give them joy. The fact is that artisans make a lot of money from the gold mines hence they are not scared of spending to entice women thereby luring them to bed and spreading all sorts of sexually transmitted diseases including the dreaded Acquired Immune Deficiency Syndrome (AIDS) (see plate a). In most artisanal gold mines visited, the disease (AIDS) has wiped off a lot of lives in mining communities and is currently accounting for the shortage of active work force in many artisanal mines (Kankara & Shehu, 2008).



Plate b: Stream during dry season showing pollution



Plate c: Kaolin mining pits, Dutsin-Ma, Katsina State, 2012.Kano State, Northern Nigeria.

Source: work, State S2014

The land is degraded and deprived of farming



Plate d: Poor yam sellers crushing auriferous quartzite



Plate e: Taking Coordinate of a well degraded by Southern Nigeria (Risk of heavy metals in food stuff), heavy metals, Kebbi State, Northern Nigeria, 2012



Plate f: Degraded lands after Kaolin mines



Plate g: Illegal Kaolin mines, Kankara Katsina State, Dundubus, Giwa LGA, Kaduna State, 2008 - 2012 (Coordinate: 110° 21.766'N, 70° 28.591'E)



Plate h: Runic granites can serve as dimension



Plate i: Schist beddings, Zamfara State, 2012. Stones, as can be seen here in Ikara, Kaduna State, Possibility of gold occurrence

Table 2: Production value and number of production units of Mining and quarrying Industries, 1995 to 1999

Year/Period	1995	1996	1997	1998	1999
No. of Units	-	-	183	183	183
Production value (millions of US Dollars)	1,127,157	1,600,634	1,475,743	1,022,044	1,085,969

Source: ECOWAS, Social and Economic Indicators, 2000

Table 3: Major Mineral reserves in Nigeria and their Locations

Mineral	Location of Known Deposit	State	Reserves (In Metric Tons)
Baryte	Akiri Hill, Wukari	Taraba, Plateau	5 million
Bentonite	Gashua, Mayo	Yobe, Adamawa	700 million
Bitumen	Belwa	Ondo, Ogun, Edo	42 billion
Columbite	Jos area	Plateau	500,000
Coal	Enugu, Okaba	Enugu, Kogi	million 3 billion
Diatomite	Borno	Borno	10 million
Diatomite	FCT, Oskara, Ukpilla, Igarra, Ikpeshi, Igbetti	Kogi, Edo, Oyo	20 million
Gold	Ilesha	Osun, Kaduna	2 million *NA
Gypsum	Dambo, Wurno, Gada, Kukar Maje, Sheleng	Borno, Sokoto, Adamawa	50 million
Iron Ore	Itakpe	Kogi, Enugu	110 million
Lead/Zinc		Enugu, Abia, Benue, Plateau, Bauchi, Taraba, Niger, Kano	10 million
Limestone	Sokoto	Sokoto, Kogi, Gombe, Benue, Ogun, Enugu, Edo, Cross-Rivers	1.4 billion
Limestone	Nkalagu	Enugu	800 million
Marble	Jakura	Kogi	45 million
Kaolin	Kankara, Pategi	Katsina, Kwara	3 billion
Talc	Ilesha, Isanlu, Kagara	Osun, Kogi, Niger	400 million
Tantalite	Jos area	Plateau	20,000 billion

Source: Federal Ministry of Solid Mineral Development, 2010

*NA= Not Ascertained

Conclusion

No matter how large or small mining operation is, it has the potential of improving the living standard of the people living in that community. If a disseminated gold ore body can be shown to contain upwards of 200,000 to 250,000 ounces it can form the exploration targets for companies that wish to invest in such deposit, and open up various mines. In the past few years there have been a call on government and private investors to organize the illegal operators into cooperatives to legalize such mining activities, and to set up lapidaries and gemmological laboratories to process the stones.

For rapid industrialization, power must be cheaply and readily available. The mineral resources of industrial power are coal, oil, natural gas and radioactive minerals. In the 1950's and prior to the discovery of oil, coal contributed nearly 90% of the national energy mix, but this declined to about 0.4% since the 1990's.

Mining operations has the potential to significantly affect the socio-economic opportunities of the poor in those communities by boosting their income level. Gold mining operations provides substantial additional employment opportunities with higher income generation potential than most, if not all, other employment in areas where mining operation takes place. Aside from mining operation's direct employment impact, there is substantial potential for developing other economic activities with suppliers of essential goods and services, particularly for small- and medium-sized enterprises, which in turn generates employment opportunities for non-miners around the area. Typically, employment generated indirectly by a mining operation amounts to a range of between 2 to 25 times the number of direct employees, in certain cases even more than that. Typical examples in Nigeria are clearly shown in most gold mining communities in Birnin-Gwari, Zamfara and Birnin-Yauri in Kebbi State with a serious boost in the activities of the communities.

Studies have shown that every dollar spent by a mine on operations could generate an average of 2.8 dollars in the local economy, in terms of induced economic activities. A successful mining operation can be a catalyst for further inflow of private-sector investment in a country or region. Consequently, Lawyers in the country have called for the amendment of 1999 constitution to ensure that the mining laws are now included in the concurrent legislative list, contrary to the existing whereby mining operations is restricted to the exclusive list. By so doing, states governments can then be accommodated in mining.

Recommendations

The research has substantiated the fact that the deposits of minerals can play vital roles towards improving the economy of the country. The following recommendations are made:

1. To have favorable wider markets, the federal and states' government should implement an investor-convenience by providing them with adequate facilities, enough documents and information about the existing resources and to have good security for them.
2. With proper government legislation, assistance in modern mining technology and machinery acquisition, creation of minerals market and adequate funding, Mineral exploration and or mining can stimulate local and economic growth, with its multiplier effects on the nation's economy.
3. States and private universities should be encouraged to establish courses on mining engineering to facilitate such.
4. Governments should be meeting with investors to discuss about market and economic situation especially on the fluctuation of currency exchange, political and economic situation of the country.

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