

PROMOTION OF ECONOMIC ACTIVITIES THROUGH DEVELOPMENT OF SOLID MINERAL POTENTIALS IN THE STATES

DR. F. E. ONAH

I Introduction

As a starting point, let us for a moment reflect on the topic of this paper. Ordinarily, the development of the mineral sector, or any other sector of the economy, promotes economic activities through investment, employment of resources, increased output, and enlarged aggregate demand. Attempts to satisfy increased demand initiate, in the absence of counteracting measures, a further process of economic expansion. This type of development need not necessarily involve changes in the institutional or policy environment.

It is doubtful if it is this type of development (defined as a gradual process of advancement) that this topic seeks to address. The development and exploitation of mineral resources have been going on in the country since the colonial days. For instance, the Mineral Oils Act promulgated to regulate the right to search for, win and work mineral oils dates back to 1914 (Fed. Rep. of Nig., 1965: 5). With respect to solid minerals, coal was discovered in 1906 and mining started in 1916 (Ugwu, 1996:63). It may not therefore make sense to call for the development of the mineral sector unless one has behind that call some catalyst that would bring about reinvigoration of the process of development.

When, however, reference is made in the title to mineral resources in states, what is conjured up is the current debate in political circles in the country concerning resource control and sharing. Oil-producing states in the country are demanding similar

treatment for offshore and onshore oil mining operations. On the other hand, non-oil producing states argue that the benefits of offshore mining should continue to accrue to, and be managed in, the interest of all the states by the Federal Government. To resolve the impasse, the Federal Government went to the Supreme Court and prayed it to determine whether offshore and onshore mining should be treated alike.

The scope of the debate has now been broadened to include non-oil minerals. The governors of the South-South Geopolitical Zone asserted in March this year that the future of Nigeria depended on the decision or otherwise of the Federal Government to allow the various sections of the country control their resources (Adeoye, 2001: 1-2). On April 23, the governors of 16 granite-rich states met at Akure in Ondo State to deliberate on how to sponsor a bill at the National Assembly on the need to review the country's mining laws. They called on the Federal Government to adopt measures aimed at the development and exploitation of granite which is abundant in their states. According to the host governor, all levels of government in the country, as well as the host communities, would benefit directly from the exploitation of the mineral (Odesola, 2001: 48). No doubt, this meeting and the call for the exploitation of the mineral were intended to remind the nation that non-oil producing states were also endowed with some other types of mineral resources from which the country could benefit.

The essence of the foregoing discussion is to show that it is either the issue of resource control or the need to articulate strategies for revitalizing the mineral sector of the country, or both, that informed the framing of the topic of this paper. In what follows we shall address both issues. However, it is necessary to point out that the resource control issue is a constitutional matter and as such should ultimately be resolved

politically (Maduagu, 2001:1). This is because both the 1979 and 1999 constitutions place mines and minerals, including oil fields, oil mining, geological surveys, and natural gas within the exclusive legislative list of the Federal Government (Fed. Rep. Of Nig., 1979:106; 1999: 131). Our treatment of the subject shall go only as far as economic considerations permit.

II. Solid Minerals and Classification

Minerals may be defined as naturally occurring substances derived from the earth's crust and upper mantle which are of value to man. They include such broad groups as ferrous, non-ferrous and non-metallic substances. By simple elimination, therefore, solid minerals cover all such substances excluding crude oil, gas and water (Committee on National Policy on Solid Minerals (CNPSM), 1995: 4). Examples of solid minerals are given in the following classification.

Classification

There are very many alternative ways of categorizing solid mineral resources. The approach to classification depends on the purpose on hand. They could be classified by reference to commodities, sector of activity, industrial use, mode of occurrence, size and spread of deposits, etc. Whatever mode of classification adopted depends on the scope of analysis to be undertaken, that is, on whether analysis is from the point of view of the user, or of the suppliers or of the controller and regulator.

For our purpose, we adopt the classification of the Department of Geological Survey which groups solid minerals by reference to use:

- a) **Mineral Fuels:** In this class are such minerals as coal, lignite, bitumen, uranium and thorium.
- b) **Structural and Building Materials:** These include limestone, stone, gypsum, asbestos, sand, gravel, marble, and ceramic materials such as clay, feldspar, dolomite, fluor spar asbestos etc.
- c) **Industrial Materials:** This category includes the following four types of solid minerals:
- i) Chemical Materials such as salt, sodium carbonate and sulphate, potash, phosphate, nitrates, sulphur, etc;
 - ii) Metallurgical and refractory materials which include metallic ores, fluor spar, graphite, limestone, dolomite, refractory clays, kyanite, etc;
 - iii) Abrasives within which are corundum, quartz, sand, diatomite, monazite etc;
 - iv) Other industrial and manufacturing materials that include asbestos, mica, talc, monazite, etc;
 - v) Gemstones: These include aquamarine, emerald, diamond, ruby, almandine, garnet, sapphire, amethyst, tourmaline, zircon, topaz, etc.

Quite often, the government, as a controller and regulator may wish to separate some minerals from the general classifications for special reasons, such as protection of:

- i) National interest: Within this category are fuels like coal, lignite, and thorium.
- ii) Security interest: Such minerals include uranium and fissionable materials.

- iii) Strategic industrial interest: In this group are iron ore, gypsum, etc (CNPSM: 5).

III Nigeria's Solid Mineral Resources and Location

Nigeria is blessed with a wide variety of solid minerals. These include coal, cassiterite (tin ore), columbite, marble, tantalite, wolfram, gold, lead, zinc, limestone, kaolin, clay, shales, radioactive minerals such as monazite, zircon, molybdenite and barytes. Others are glass sand, bitumen sand, uranium, serpentine, phosphate, cuprite, granite, talc ore, gypsum, feldspar, bentonite, soda ash, iron ore, dolomite, etc (Aliyu, 1996: 10; Ministry of Mines and Power, 1968: 17 – 22; Fed. Rep. of Nig. , 1980: 80). Some of these minerals are currently mined while some others have the potential of being exploited on commercial scale.

These mineral resources are spread throughout the country. The dispersion is indicated in Table 1. For instance, iron ore, ironstone, limestone, and clay are found in very many localities of many states in the country. However, Plateau, Bauchi and Kogi states dominate the scene, possessing most of the mineral resources listed in the Table.

Table 1: Geographical Dispersion of Solid Minerals in Nigeria

Mineral	Location
1. Iron ore	Itakpe, Chakochocho, Ajabonoko, Obajana, Ebija, and Okudu in Kogi State; Muro in Plateau State; Bingi and Maraba in Maru District of N. Nigeria; Ajase in Osun State; Birni Kebbi; and Gusaka in Sokoto State.
2. Ironstone	Dakingari in Sokoto State; Tajimi in Kaduna State; Rishi in Bauchi State; Karfa in Borno State; Ejejeja in Benue State; Nsude in Enugu State; Lokoja and Akpanya in Kogi State; Batati and Sakpe in Niger State.
3.. Cassiterite	Jos in Plateau State, Bauchi.
4. Columbite	Plateau, Kaduna, Kano, Bauchi, Ondo, Abuja and Kwara.
5. Tantalite	Plateau, Bauchi, Kaduna and Ondo.
6. Manganese	Mallam Ayuba in Kaduna State, Zaria.
7. Vanadium	Abuja.
8. Nickel	Ife – Ilesha in Osun State.
9. Chromite	Sokoto and Katsina.
10.Molybdenum	Plateau
11.Wolfram	Bauchi, Kano and Kaduna
12.Ilmenite	Plateau, Kaduna, Niger, Osun and Kwara
13. Tourmaline	Plateau, Kaduna and Kwara
14. Zircon	Kaduna
15. Limestone	Nkalagu in Enugu State, Odumoke in Ebonyi State, Mfamoshi and Odukpau in Cross River State, Ewekoro in Ogun State; Igumale, Ogbolokuta and Yandeu in Benue State, Ashaka, Bauchi, Kanawa, Kambiena in Sokoto State, Umu-Obom and Ohafia in Abia State.
16. Marble	Jakura, Ubo and Ajaokuta in Kogi State, Ukpilla in Edo State, Itobe in Benue State and Kankara in Katsina State.
17. Dolomite	Osara and Elebu in Kogi State, Burum and Taka Lafia in the Federal Capital Territory, and Igbetti in Oyo State.
18. Clay	Ozubulu, Ihiala and Nnewi in Anambra State, Enugu, Kankara in Katsina State, Maraba-Rido in Kaduna State, Onibode, Lisabi and Miroko in Ogun State, Jos and Ropp in Plateau State, Biu and Maiduguri in Borno State; Ukwunzu in Delta State, Bende, and Ohaozara in Abia State, Nsu in Imo State, Umuahia in Abia State, Garkidda and Taraba/Adamawa, Dawakin, Minjibar and Tsanyawa in Kano State, Illo and Kaoje in Sokoto state, Ifon and Igbotako in Ondo State.
19. Emerald	Keffi in Plateau State
20. Aquamarine	Keffi in Plateau and Jamaa in Kaduna States
21. Ruby	Kaduna
22. Sapphire	Kaduna
23. Amethyst	Zaria Dala in Kaduna state, Panama Ilemga Hill in Kaduna State,

	and Tafawa Balewa in Bauchi State.
24. Rock Crystal	Jos Plateau
25. Garnet	Various locations
26. Topaz	Jos Plateau
27. Fluorspar	Jos Plateau
28. Tourmaline	Jos Plateau
29. Coal	Enugu, Benue, Kogi, Obi-Lafia in Nassarawa State
30. Lignite	Enugu and Anambra States
31. Lead and Zinc	Abakaliki, Amaka, Amaeri, Enuigba, Ekwetekwe, Ika Inyere and Uburu in Ebonyi State, Ishiagu in Abia State, Awe and Arufu in Nassarawa State and Tunga and Zunak in Adamawa/Taraba States, Gwona in Bauchi State.

IV The Concern for Development of the Subsector

The concern for the development of the solid minerals subsector has been expressed not only by the organizers of the workshop but also by the Federal Ministry of Solid Minerals Development. According to the latter, the subsector is an important part of the national economy with a potential of raising, at its full realization as much resources for the public sector and of contributing to the gross domestic product (GDP) of the country about as much as is currently being contributed by the petroleum subsector (CNPSM: 4). The concern has been motivated by the declining role of the subsector as well as by its perceived potentials for development.

Prior to the emergence of petroleum in the mid nineteen seventies as a major foreign exchange earner, solid minerals subsector ranked second only to the agricultural sector as a source of export earnings. The subsector also contributed substantially to national output, accounting for about 10 per cent of the GDP in 1970 (Kogbe, 1976: 425). As shown in Table 2, its annual output averaged some 130.8 thousand metric tonnes over the years 1970 – 73. It employed, on the average, about 49 thousand workers per annum over the period 1958 – 1970 as shown in Table 3.

However, with the exit of foreign multinational mining companies and their expatriate professionals in the wake of the 1972 Indigenisation Decree, the performance of the subsector began to dwindle. First, annual production declined, particularly in metallic minerals. The tempo of mining activities shifted to industrial non-metallic minerals needed for construction, building and industrial applications in domestic industries. As shown in Tables 2 and 3, the average output of metallic minerals dropped from more than 13 thousand metric tonnes over the period 1970 – 73 to about 0.34 thousand metric tonnes over 1991 – 98. Second, the employment figures of the subsector dropped from about 49 thousand over 1958 – 70 to about 5 thousand workers over the period 1988 – 93 as shown in Tables 4 and 5.

Table 2: Nigeria's Solid Mineral Production, 1970 – 73 (Metric tons)

Mineral	1970	1971	1972	1973	Average
Cassiterite	10,758.28	9,902.09	9,104.79	7,889.41	9,413.64
Columbite	1665.72	1,376.20	13,58.77	1,241.05	1,410.44
Clay	-	21,271.49	21,861.54	28,939.01	24,024.01
Coal	54,254.04	194,603.64	340,183.75	327,133.24	229,043.67
Gold(grams)	3,764.75	1,599.80	468.37	648.08	1,620.25
Kaolin	487.68	223.52	-	-	355.60
Lead ore	-	449.78	575.82	633.17	552.92
Limestone	700,704.72	967,328.52	1,513,065.64	1,828,773.82	1,252468.18
Marble	3,028.70	4,894.99	4,051.81	9,132.59	5,277.02
Molybdenite	18.29	2.54	-	-	10.42
Monazite	12.70	89.74	10.32	5.02	29.45
Tantalite	4.88	4.36	1.36	0.79	2.85
Wolframite	-	0.03	1.07	2.26	1.12
Shale	113,121.44	129,798.06	1468,802.86	133,378.45	130775.20

Source: Kogbe, C. A. and A. U. Obialo, 1974:425

Table 3: Production of Principal Solid Minerals in Nigeria, 1991-96 (Metric tons)

Year	Cassiterite	Columbite	Coal	Clay	Limestone	Marble
1991	144.92	36.00	100,074.00	12,174.00	11,378,891.00	602.00
1992	107.17	37.61	78,912.00	407.00	37,224,250.00	702.00
1993	175.39	15.43	27,686.00	625.00	1,411,045.00	716.00
1994	208.30	229.89	13,153.00	n.a	3,239,030.00	539.50
1995	203.75	37.00	19,505.00	n.a	3,656,598.00	1329.00
1996	139.32	565.60	15,310.00	n.a	2,095,219.60	477.00
1997	42.45	29.57	20,766.00	n.a	2,430,719.70	20,346.00
1998	n.a	620.50	18,473.00	n.a	1,919,952.40	87,841.30
Average	145.90	196.45	36,734.87	4,402.00	7,919,463.21	14,069.10

Sources: FOS (1996: 287; 1996: 387).

Table 4: Number of Persons Employed in Solid Mineral Mining in Nigeria 1958 – 70

Year	Tin and Associated metals ^(a)	Lead, Zinc, etc.	Gold	Coal	Limestone	Marble	Total
1958	33,496	143	272	8295			42,206
1959	29,290	168	266	6410			36,134
1960	36,634	91	91	3878			40,794
1961	40,149	52	68	3948	205		44,522
1962	43,767	25	80	3876	251		48,099
1963	45,362	32	100	3796	257		49,547
1964	44,627	66	71	3970	303	233	49,037
1965	53,454	305	44	4282	310	76	58,471
1966	54,454	483	29	4323	295	70	59,654
1967	57,673	345	43	na	295	na	52,356
1968	50,101	9	66	na	na	na	50,176
1969	49,126	6	64	na	na	na	49,196
1970	51,795	6	31	414	na	na	52,246
Average	44,918	133	117	4,320	274	126	48,649

Note: na = not available

a: Includes cassiterite, columbite, tantalite, and wolfrinite

Sources: Kogbe, C. A. and A. U. Obialo, 1974: 401; Digest of Statistics, Vol. 21, p. 8

Table 5: Persons Employed in Solid Mineral Mining, 1988-1993

Year	Tin and associated metals*	Lead and zinc etc	Coal	Total
1988	3849	52	1576	5,477
1989	4411	30	1661	6,102
1990	n.a	n.a	1445	n.a
1991	n.a	n.a	1339	n.a
1992	3849	52	1069	4,970
1993	4411	30	n.a	4,441
Average	4130	41	1,418	5,248

*= Cassiterite, columbite, tantalite and wolfrinite etc.

Source: FOS, 1996: 213; 1995: 199

V. Evolution of Policy and Governance of the Subsector

To a large extent, the performance of the subsector could be attributed to the policy environment. Organised mining activities began in Nigeria between 1902 and 1923 following the commissioning in 1903 and 1904 of mineral surveys of the Southern and Northern Protectorates by the then British Secretary of State for the colonies. Modern mining of tin ore (cassiterite and associated minerals) was initiated by the Royal Niger Company in 1905. the mining of gold in what are now known as Niger and Kogi states began in 1914. As has already been pointed out in the introductory paragraph, coal mining began at Enugu in 1916. By 1919, the Geological Survey of Nigeria was established as a Department of government to take over and continue mineral surveys of the country.

The Minerals Ordinance of 1946 and the Coal Ordinance No. 29 of 1950 provided the legal basis for the development of solid minerals in Nigeria (CNPSM: 6).

The former vested ownership of all minerals in the British crown. It provides that “the entire property in land and control of minerals and mineral oils, in or under or upon any lands in Nigeria, and of rivers, streams and watercourses throughout Nigeria, is and shall be vested in the state”. The Minister of Mines and Power was empowered to grant prospecting and mining rights and leases to individuals and/or corporate organizations on application and payment of appropriate fees (Fed. Rep. of Nig., 1965: 47, 52-61).

From the foregoing it is clear that the original cardinal principle of government’s policy on prospecting and extracting mineral resources of the country on commercial basis was non-investment of public funds in the risk of mining investment. It was believed that investment in mining activities involved larger sums of money on prospecting without any certainty of remunerative returns. The policy engendered a situation whereby large-scale foreign companies and small-scale indigenous miners concentrated their efforts on the production of minerals with export potential, neglecting minerals meant for local industries. Apart from coal which was and still is mined by a government department, the mining of solid minerals was entirely in the hands of private expatriate and indigenous companies and entrepreneurs.

Prior to 1971, British mining companies dominated the scene with up to 120 companies at the peak of tin mining (CNPSM, 6). These companies were well equipped. They employed qualified staff and paid detailed attention to efficiency considerations. All these combined to make large-sized output and employment possible (See Tables 2 and 4).

The Minerals Ordinance of 1946 and allied regulations which were re-enacted as the Minerals Act of 1959 applied globally to the exploration and exploitation of minerals

without any particular distinction to special sets of minerals singly or in groups.

However, as years passed, the development of mining particular minerals necessitated special regulations and led to the enactment of special Acts to govern the exploitation of special minerals. Such Acts included the Nigerian Coal Mining Act of 1950, the Gold and Diamond Trading Act, the Explosives Act of 1964 and Allied Regulations Act of 1969, the Tin Act No. 25 of 1967, and the Quarries Act and Allied Regulations of 1969.

In 1971 the policy was drastically reviewed. Government decided to act as catalyst in the mining sector through the establishment of mining corporations which would use government funds for mining. The main policy thrust was the rejection of the concept of private-sector-led development of the solid mineral subsector. Government stated as follows:

In brief, the objective of government's mining policy would be to secure the development, conservation and utilisation of the mineral resources of Nigeria in the best possible manner so as to bring about economic benefit for the largest possible period, and there is no reason to suppose that the private investor is the best instrument with which to achieve this (CNPSM, 8)

The foregoing policy statement implied that if prospecting and exploitation of minerals were to remain solely in the private sector as under the existing policy, the country would not enjoy the best advantage that could be derived from the revised policy. To achieve the objectives of the new policy, government which had hitherto refrained from direct participation decided to participate directly in the mining industry. First, it established a Mining Corporation in 1972 to engage in direct investment in the exploitation of known economically viable minerals other than coal and marble. Second, it expanded the Geological Survey Department and Mines Division of the

Ministry of Mines and Power to play a more intensive role in the scheme of things.

Specifically, the departments were to promote the diversification of primary mineral products through extensive geological exploration and mineral beneficiation appraisals respectively. Third, the issue of prospecting permits was decentralized to Inspectors of Mines in State Mines Offices. Fourth, to encourage intensive exploration over large areas for specific minerals, government offered incentives by way of concessions. Finally, government upgraded the training in mining engineering by establishing a new Institute to take in the graduates of the School of Mines (established at Jos in 1952 as an in-house training centre for the Mines Department) to train them further in mining engineering. Moreover, a Metallurgical Institute was created to develop a metallurgical laboratory. Following the 1987 review, the Raw Materials Development Centre was created as a successor to the Metallurgical Research and Development Centre while the Mining Institute absorbed the School of Mines.

With the exit of multinational companies and their expatriate professionals following the Indigenisation Decree of 1972, the bulk of mining operations by the private sector rested on the shoulders of small-scale indigenous miners. The surface, near surface and shallow depth deposits of the minerals had by then been depleted. These factors were largely responsible for production decline particularly in the metallic minerals. As a consequence, there was a shift of the tempo of mining activities to industrial non-metallic minerals needed for construction, building and industrial application for domestic industries.

Furthermore, the downturn of the country's economy adversely affected the exploration as well as exploitation of even the non-metallic minerals. The Inspectorate

Department of the Ministry of Mines and Power was ill-equipped. It lacked adequate and suitable manpower to carry out surveillance of the minefields with a view to ensuring compliance to safety standards and to man the exit points to identify mineral commodities being exported. Illegal mining and speculative pegging by legal title holders were rife. These problems were further compounded by administrative bottlenecks which included cumbersome procedure in processing mining applications leading to long delays, difficulties in obtaining consent to enter land for the purpose of prospecting and mining, and procedural reports necessary for the approval of applications (CNPSM, 9).

VI. Government Direct Participation

Government direct involvement in the solid mineral subsector has been conducted through three parastatal organizations and an agency. Minerals like coal, iron ore and bitumen have always been under the complete control of government both in exploration and exploitation. In addition the Nigerian Mining Corporation (NMC) was established in 1972 to develop solid minerals with the exception of coal and iron ore. Through subsidiaries, it engaged in the exploitation of kaolin, barytes, cassiterite, columbite, limestone and clays. The Nigerian Coal Corporation (NCC) has been responsible for mining coal while the Nigerian Uranium Mining Company (NUMCO) was incorporated to mine and develop uranium. The bitumen project is currently managed by the Ministry of Solid Minerals Development.

In addition to the above parastatals (under the Ministry responsible for solid minerals) through which government exercised control and direct involvement, there are other parastatals whose activities interface with those of the former but which report to

other Ministries. These include the Nigerian Iron Ore Mining Company (NIOMCO) which mines iron ore at Itakpe for the Ministry of Power and Steel, the National Steel Raw Materials Exploration Agency (NSRMEA) which concentrates on exploration of iron ore, the National Metallurgical Development Centre (NMDC) whose focus is on research in mineral processing and downstream utilization studies on minerals, and the Raw Materials Research and Development Council (RMRDC) located in the Ministry of Science and Technology to source local raw materials-agricultural, forest, minerals and chemical-for domestic industries.

Despite the heavy public expenditure involved in the maintenance and operations of the above corporations, the expected economic advantages that informed the 1971 review of mining policy are still far from being realized. The production activities of these bodies have been characterized by poor coordination, low productivity, inefficiency, overstaffing and poor or negative returns on investment. It is therefore the desire to counter these negative tendencies that motivated the Ministry of Solid Minerals Development to set up a committee in 1995 to advise it on administrative, legal and fiscal strategies that would facilitate orderly and continued development of the subsector.

VII. The Potentials of the Subsector

The mere existence of mineral deposits is not enough to justify the hope in the exploitation and development of solid minerals. They must be capable of being worked economically, that is, at a profit. This involves a number of considerations in addition to purely geological ones. The profitability of a mineral product depends upon cost of

mining, treating, transporting and marketing the product, upon the price it commands in the market, and upon the degree of support or protection afforded by government through trade or taxation policies.

When these criteria are applied to Nigeria's solid mineral resources, one finds that the geological prerequisites for profitable exploitation are satisfied. First, there are ample reserves of the minerals to guarantee sustained mining for many years. Table 6 presents information on known resources of the minerals where data in that regard exist.

Table 6: Known Reserves of Nigeria's Solid Minerals, 1996 (Metric tons)

Minerals	Reserves
Kaolin ore	1031.2
Talc ore	0.2 million
Phosphate ore	n.d
Limestone	8367.82 million
Gypsum	156.5 billion
Feldspar	n.d
Bentonite	700 million plus
Barytes	n.d
Soda ash ore	n.d
Marble	80.2 million
Iron ore	470 million
Clay	166.9 million
Coal	2128.6 million
Lead and zinc	4.63 million
Iron stone	2060 million
Columbite	n.d
Tantalite	n.d
Dolomite	35.6 million
Gemstone	n.d

Note: n.d = not determined

Sources: Aliyu, A. (1996), various pages; Ezepeue, II; and NCPSM, 27

Second, with respect to the accessibility of deposits, Nigeria is said to be underlain by two rock types – the Basement Complex rocks and the Sedimentary

Strata. The former type belongs essentially to the late magmatic and hydrothermal phases and contains endogenous mineral deposits. The depth of the minerals ranges from moderately deep to shallow. Solid minerals hosted by the Basement Complexes include cassiterite, tantalite, gold, molybdenite, chalcopyrite, pyrite, tourmaline emerald, topaz, ruby, chromite, talc, etc.

Sedimentary rocks have been formed through sedimentary processes by weathering, erosion and deposition and therefore are on or close to earth surface. Solid minerals associated with this type of rocks include coal, iron ore, limestone and dolomite, clay (fire clay, kaolinite, brickclay and bentonite), fluorite, alluvial tin, galena, sphalerite, barytes, diatomite and phosphates (Ezepue, 3-8).

When it comes to statistics on production, transportation, marketing and sale that would facilitate evolution of profitability, one faces a great dearth of information on solid minerals. The best that could be done in the circumstance is therefore, to draw an inference from the demand and supply conditions. In this regard, Table 7 indicates the many industrial uses of processed forms of some of the minerals. The suggestion here is that as the pace of industrialization progresses, the demand for these mineral products would grow, thus indicating the potential for the development of the solid mineral subsector.

This conclusion is strengthened by the data in Table 8. Columns 3 and 4 of the Table give information on national demand and supply of some beneficiated minerals in Nigeria. Column 5 shows the extent of excess demand. Figures in parentheses indicate that the shortfall in supply of the products ranges from 80 percent for barytes to 100

percent for phosphates, gypsum and bentonite. The Table therefore indicates the existence of ample potential for production expansion in the listed minerals.

Table 7: Principal Uses of some of Nigeria's Processed Minerals

S/N	Minerals	Principal Uses
1	Kaolin	Paper, rubber, pottery, ceramics and pharmaceuticals
2	Talc	Ceramics, paint and cosmetics
3	Phosphate	Fertilizers
4	Limestone	Fertilizers
5	Lime	Water treatment and steel making
6	Gypsum	Cement
7	Feldspar	Glass, pottery and ceramics
8	Bentonite	Water and oil well-drilling
9	Barytes	Oil-well drilling and white paint pigment
10	Soda ash	Detergent and glass

Source: Aliyu, A, 1996: 157

Table 8: Supply and Demand Statistics of Some Processed Nigeria's Minerals, 1996

S/N	Raw Material	National Demand (Quantity)	Supply (Quantity)	Shortfall
1	Beneficiated Kaolin	150,000	20,000	130,000 (87)
2	Beneficiated Talc	50,000	300	49,700 (99)
3	Beneficiated Phosphate	200,000	0	200,000 (100)
4	Beneficiated Lime	500,000	20,000	480,000 (96)
5	Beneficiated Gypsum	300,000	0	300,000 (100)
6	Beneficiated Feldspar	100,000	10,000	90,000 (90)
7	Beneficiated Bentonite	60,000	0	60,000 (100)
8	Beneficiated Barytes	100,000	20,000	80,000 (80)
9	Soda Ash	60,000	300	49,700 (99)

Source: Aliyu, A, 1996: 158

This analysis goes for other mineral resources. It is clear from results of surveys conducted by the Raw Materials Research and Development Council that Nigeria is blessed with most of the mineral raw materials needed as inputs for industrial production. What is needed is the processing of these raw materials into intermediate products required for industries (Aliyu, 155).

VII Government Protection

Reference was made in section VI to government support or protection afforded to the subsector through trade or taxation policies. By protection is meant any action taken by government that is capable of promoting the development of the subsector.. Such actions include promotion of local processing of raw minerals, streamlining of the roles of different levels of authority, promotion of private investment in the subsector, provision and dissemination of geological information and provision of finance. In what follows an attempt is made to indicate how government can play a positive role in respect of each of these issues.

VII.I Encouragement of Local Processing

It has been indicated above that one of the ways to help develop mining is the processing of raw minerals. This action would not only increase the value added of the subsector but also lead to the expansion of mining activities by enlarging the demand for the minerals. Government can promote processing by use of fiscal incentives.

However, it is necessary to ensure that the companies that process the raw minerals use locally mined minerals instead of sourcing their raw materials from abroad.

This warning has been necessitated by the revelation that producers of tin ore concentrate chose to export their product rather than supply them to domestic processors because the latter were unwilling to purchase them at prices comparable to those of the international market (Aliyu, 162). To avert this type of happening, domestic processors of minerals should be encouraged by means of some sort of incentive to source their inputs locally.

VIII.2 Ownership and Control

Under the existing laws and regulations only the Federal government has the power to authorise any form of mining activity because ownership of all minerals is vested in it. The miner has, however, to process his application through several layers of subordinate authorities. These include local landowner or community for access to the minefield, the local government authority for its consent, the State Department of Agriculture and Forestry for land use evaluations, the State government for authorisation under the Land Use Decree and the State Surveyor General for a final survey plan. This process gives rise to long delays as procedural reports have to be filed in before final approval is granted.

At one level, the questions then to be addressed relate to how to bring these tiers of authority into the process without jeopardising the chances of a worthy applicant having his application back-balled for purely local reasons; how far to go down the scale of authority to satisfy the lower tiers in their quest for self identification; how far to define the roles so that there would be no conflict of roles and how to reduce the waiting time between the submission and approval of applications. At the other level is how to

accommodate state governments' agitation for a share in the ownership and control of mineral resources located in their lands.

In these regards we need to borrow from the experience of the United States of America after which our political system has been modeled. It is true that the history and pattern of political and economic development of the U.S. differ from those of Nigeria. However, there are certain aspects of the former that are desirable and whose replication in Nigeria would make for socio-economic stability. An example of such aspects is the institution of land ownership and control and navigation, industrial uses, power development, sites for hospitals, offices, storage, housing, and other purposes (Burns and Peltason, 1957:676).

In the U.S. ownership of land and minerals is on the concurrent legislative list of both the central and state governments. The central government owns some 405.1 million acres or 21.3 percent of the entire land area of the country. Central government land is reserved for forest and wildlife, grazing, military, airfields, reclamation and irrigation, flood control.

Mineral resources found in central government lands are the exclusive property of the Federal Government of the U.S. The U. S. Government surrenders only a certain percentage of the proceeds to minerals mined from its lands to the states within which such lands are located. Whatever mineral resources that are found in lands outside the central government territories belong to the respective states. This arrangement serves the interest of both the central and state governments and resolves the squabbles over resources ownership and control.

Where agitations persisted for a longer time over resource ownership and sharing was on the issue of offshore oil deposits of the U.S. between the low-water mark and the three-mile limit. The debate lasted for many years. The Supreme Court ruled that the national government had a paramount interest in the offshore oil. In 1946 President Truman vetoed an act of Congress handing over ownership of the oil to the states. In 1952 offshore oil became an election issue, and the following year Congress passed and President Eisenhower signed a bill vesting in the states involved title to submerged lands and resources within their historic boundaries, while confirming federal ownership of submerged lands of the continental shelf beyond state boundaries (Burns and Peltason, 1957:679). By implication, any other type of minerals located within the coastal waters of the U.S. benefitted from this piece of legislation.

The above American experience is elucidating. The Federal Government of Nigeria may wish to sponsor an amendment in the nations Constitution to give title to land to both state and federal government. To give effect to dual ownership of land, the Federal Government should carve out parcels of land in each state for various purposes similar to those listed in respect of the United States. Ownership of land and resources, including minerals, outside the federal lands should revert to the states concerned. Mineral resources in Federal lands should belong to and be controlled by the Federal Government, of course, subject to the payment to states of a certain percentage of the revenue accruing from the exploitation of such minerals on the principle of derivation.

An alternative to the concurrent ownership of land and minerals by both the federal and state governments is one in which the state is given a measure not of the right of ownership but of authority and responsibility while the right of ownership is

reserved for the federal government. In this arrangement state governments are empowered to grant prospecting and mining licences and permits to investors on behalf of the federal government. State governments are also allowed to attract investors, collect mining rents and royalties and, in return for the authority granted them, pay a specified percentage of the proceeds to the federal government. In this way, too, the issue of resource control in respect of mineral resources is resolved to the satisfaction of both the federal and state governments.

State's ownership and control of mineral resources within their territories would encourage increased exploitation of minerals. States would compete to attract entrepreneurial investment by means of fiscal and other incentives. Increased investment and employment of resources in the mineral sector would no doubt expand economic activities in the states and help reduce the pecuniary problems of states that are blessed with abundant mineral deposits. For the states that are not so blessed, a special grant from the Federation Accounts should be given to them. While this arrangement takes care of the interest of the national government, mineral rich states and non-mineral-rich states, it has the potential for promoting economic activities in the states.

VIII.3 Promotion of Private Investment in the Subsector

Sometimes, the private sector is restricted or completely excluded from certain areas of activity or from certain minerals which are reserved for the government in the national or strategic interest. This has been one of the reasons for government direct

involvement in the mining of such solid minerals like coal, iron ore, uranium, bitumen and a host of other minerals.

It is our view that even where a mineral or group of minerals is declared to be strategic or of national interest, it does not follow that government must itself engage in the exploitation of such minerals. What is necessary is for government to lay down procedures for monitoring the development in the subsector, have in its hands full information on the progress being made, and exercise sufficient regulatory control of the operations so that in effect the private agencies working in that subsector see themselves as working for the government as well as for themselves. An additional safeguard is that foreign interest should not be so concentrated in one group of activities to make it possible for any singular multinational operator to hold the country to ransom.

A second reason for government direct participation in mining activities was to provide raw materials for downstream industries. For example, Itakpe iron ore deposits are being exploited by a government agency for the Ajaokuta Steel Industry. What is recommended in that regard is that while the existing mines being controlled by government for specific industries should continue for now other deposits in the country should be free to be exploited by the private sector. Indeed, the private sector should be encouraged to exploit other deposits for the benefit of both the existing and other future plants. What the government needs do is set up a machinery for the monitoring, regulating and controlling of the production of such minerals to the best interest of the nation.

Finally, government is said to have financed the establishment of enterprises engaged in the exploitation of some minerals because such enterprises required huge sums of money to undertake various capital intensive operations (CBN, 1992:98). Now, with the relaxation of restrictions on foreign equity capital, it is expected that private capital should be available for purchasing government interest in such enterprises. What is required of government is to provide the necessary incentives to attract foreign and domestic investment in the subsector. An added incentive for private investment in the subsector is the existence of ample demand for mining products as has been demonstrated in Table 8.

VIII.4 Provision and Dissemination of Information

The government alone has the right, power and competence in geological survey. It is an accepted fact that the rate of development in the solid mineral subsector depends on the extent to which the Geological Survey Department carries out its duties in providing land, aerial and geophysical survey data on the mineral resources of the nation. It is the duty of the Department to identify the locations of mineral resources, undertake primary exploration to yield the initial indications of the size, quality and nature of the occurrences of minerals, and carry out detailed investigation on whether further and fuller exploration could be undertaken by prospective investors.

The Ministry of Solid Minerals Development should establish a data bank containing such information as mentioned above; Such data should be made available to prospective investors in the form and on terms that would facilitate private investment in the subsector. Government should take the responsibility of marketing the information on the potentials of the subsector, using the country's foreign missions abroad to reach prospective foreign investors. The data should include details of incentives provided by government.

VII.5 Financial Support

It is necessary that government should offer financial support to private operators for the rapid development of solid minerals. This is particularly essential for small and medium scale miners. As a matter of fact this need has been generally accepted. What is unsettled is the channel for such assistance. Our view is that existing financial institutions like the the Nigerian Export-Import Bank (NEXIM) and the Bank for Industry (BOI) could be used. These institutions should be encouraged, by injection of funds, to grant loans at affordable interest rates to small and medium-scale investors in the subsector to enable them not only to cover exploration and development costs but also to cover the other needs of very small-scale miners. Happily, the Federal Government plans to establish and manage a Small-scale Mining Guarantee Scheme Fund (SSMGSF) to enhance financial assistance to such miners.

VIII Conclusion

Behind the call for the development of solid mineral resources in the country is the desire to revive and revitalise the subsector so as to enable it resume its lost place in the national economy. In terms of output and labour employment the

performance of the subsector has gone down to less than 1% and about 10% respectively of what it was as at 1970.

However, the extent and pace of development of any productive sector depends to a large degree on the extent and pace of growth of demand for and supply of its products. If the demand is not sufficient to call forth increased supply, the potential for growth is low. Thus, excess demand in the absence of fixed supply motivates growth and development. The demand for Nigeria's solid minerals, particularly structural and building materials, as well as the majority of industrial mineral inputs, far exceeds their supply and thus brightens the prospects for development in the subsector.

To facilitate the type of growth and development expected of the subsector, the private sector is expected to assume a leadership role in mining and processing activities. Such leadership is aided, among other variables, by government support and protection, hence our recommendations.

DR. F. E. ONAH

DEPARTMENT OF ECONOMICS

UNIVERSITY OF NIGERIA, NSUKKA

REFERENCES

- Adeoye, W. and T. Adisa (2001), "Ijaw Plan Resources Control Protest". *The Punch*. Vol. 17, No. 18, Lagos, Punch (Nig) Ltd, 4th March.
- Aljiyu A. (1996), *Potentials of the Solid Minerals Industry in Nigeria*, Nigeria, Raw Materials Research and Development Council (Investment Promotion).
- Burns, J. M. and J. W. Peltason (1957). *Government by the People (The Dynamics of American National Government)*, Englewood Cliff, N. J. Prentice-Hall, Inc.
- Central Bank of Nigeria (1987). *Annual Report and Statement of Accounts*, Lagos
- _____ (1990) *Annual Report and Statement of Account*, Lagos.
- _____ (1992) *Annual Report and Statement of Account*, Lagos
- Ezepue, M. C. (2001), "Memorandum on Solid Minerals: The Key to Nigeria=s Prosperity" (Presented to the National Assembly at Abuja).
- Fed. Min. of Mines and Power (1968). *Annual Report of Mines Division*. Lagos, Fed. Ministry of Information.
- Federal Office of Statistics (FOS) (1996), *Annual Abstract of Statistics*, Lagos.
- _____ (1999), *Annual Abstract of Statistics*, Lagos
- _____ (1972), *Digest of Statistics*, Vol. 21
- Fed. Rep. of Nig. (1979). *The Constitution of the Federal Republic of Nigeria*, Apapa, Times Press Ltd.
- _____ (1999) *The Constitution of the Federal Republic of Nigeria* Abuja.
- _____ (1965), *Mines Manual Containing the Minerals Act. Cap. 121 of 1946*, Apapa, Nigerian National press Ltd.
- _____ (1980), *Report of the Presidential Commission on Revenue Allocation*, Vol., Lagos, Federal Government Press.
- Kogbe, C. A. and A. U. Obialo (1974), A Statistics of Mineral Production in Nigeria, 1946-1974, and the Contribution of the Mineral Industry to the Nigerian Economy@, *Geology of Nigeria*, Kogbe C. A. (ed), Lagos, Nigeria, Elizabethan Publishing Co.
- Madunagu, E. (2001), "Court Can't Resolve Resource Control Matter", *The Punch*, Vol. 17, No. 18 Lagos, Punch (Nig.) Ltd, 31 March.
- _____ (2000), "Southern Governors Lobby Northern Counterparts", *The Punch*, Vol. 17, No. 18, Lagos, Punch (Nig) Ltd, 31 March.

Odesola, T. (2001), "16 States Close Ranks on Granite Exploration", *The Punch*, vol 17, No 18, Lagos, Punch (Nig) Ltd, 25 April.

Olanitori, B. (2001), "Federal Government urged to Evolve Energy Policy", *The Punch*, vol. 17, No. 18, Lagos, Punch (Nig) Ltd, 5 April.

The Committee on National Policy on Solid Minerals (1995), "Report of the Committee on National Policy on Solid Minerals".

Ugwu, F. N. (1996) , "Optimization of Nigerian Coal Production". *Nigerian Coal: A Resource for Energy and Investment*. H. C. Okolo and M. C. Mkpadi (eds), Abuja, Raw Materials Research and Development Council.

Umoren, C. (2001), "Resource Control: Why Northern Governors are Jittery", *The Punch* vol. 17, No. 18, Lagos, Punch (Nig) Ltd. 8 March.