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ASSESSMENT OF MINERAL WEALTH OF KOGI STATE AND ITS IMPACT ON SOCIO-ECONOMIC DEVELOPMENT

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ABSTRACT

Kogi State is vastly blessed with mineral resources much of which are not harnessed. These minerals have the potential to transform the socio-economic life of Kogi State and the nation Nigerian in general. A major step towards growth and development of Kogi State, would be the deliberate proactive engagement of its solid mineral wealth. Exploitation of her vast resources to bring about the most needed socio-economic emancipation. Mineral resources vary with environment of occurrence, namely the basement complex minerals and those associated with sedimentary environment. Four classes of solid minerals are identified based on the uses as metallic, non-metallic, fossil fuel and gem stones. Geophysical survey reveals the presence of twenty (20) known minerals - beryl, clay, coal, columbite, feldspar, garnet, gold, iron ore, kaolin, magnetite, marble, mica, muscovite, quartz, silica sand, talc, tantalite and tourmaline to exist in various quantities distributed in various locations along the twenty one (21) local government areas of the state. The potentials mineral wealth holds and the possible impact it could make on the socio-economic development of Kogi State are quite enormous. The use of these minerals and the socio-economic gains of their exploitation and usage are evaluated. A detailed geological survey to reveal more of the minerals present and their estimated reserve is needed to help in developmental plans, to also give possible investors a better clue of the mineral wealth of Kogi.

INTRODUCTION

The importance of mineral resources lies on its definition - "any natural concentration of minerals which is useful to man and that can be tapped profitably"; "the naturally occurring substances which make up the rocks of the earth's crust in the form of inorganic substances with definite chemical composition" [1]. Kogi state's mineral resources can be classified into four main groups: metallic, non-metallic fossil fuels and Gemstones [2]. Mineral resources have the potential and capacity for socio-economic development by contributing to domestic GDP, exports materials and impact greatly on industrial revolution and development. The mineral sector with its great potentials has however been constrained majorly by the insufficient exploration investment to harness its wealth creation capacities, which has led to gross underperformance in the sector and consequently, loss of economic opportunities [3].

Geological setting and lithology affect the type of minerals and location in which they occur. Certain minerals are associated with basement complex rocks

while others are are located in sedimentary environment. Mineral resources are versatile tools for development in any nation leading to rapid technological advancement, which transforming the host community into a production hub for industrial goods. Harnessing mineral wealth triggers economic revolution for sustainable development, improving the general standard of living of people drastically, increasing per capital income, creation of employment for the increasing population as small and medium scale industries will thrive on raw material availability, foreign exchange earning would improve the economy and the state would benefit from internal generated revenue as more tax payers are empowered to do so. Infact, mineral development holds the key to economic turnaround the world over.

The Ministry of Mines and Steel Development has identified that Kogi state alone has deposits of a total of 20 identified mineral resources in commercial quantities. These include coal, dolomite, feldspar, iron ore, tar, limestone, bauxite, gold etc. Each of the 21 LGAs in the state has at least 2 mineral deposit. For example, Okaba district of Ankpa LGA is a coal rich area, which alone holds reserves of 99 million tonnes of coal. Kogi state alone has enough coal deposit to supply all of Nigeria with electricity for 400 years. Kogi state limestone deposits has capacity to keep 3 giant-sized cement factories (with over 15m tons annual capacity) operational for a stretch of 99 years. In the midst of these abundant mineral wealth and endowments, Kogi State still ranks amongst the poorest states in Nigeria. Its wealth of mineral resources does not commeasure with commercial benefit. There is therefore a need for research into the area of harnessing the vast resources of Kogi State for rapid and greatly needed socio-economic development of the state. A detailed mineral data is needed, exploratory work done and subsequent exploitation to power small and medium scale enterprises, exportation and general industrial and economic development.

LOCATIONAL AND GEOLOGICAL SETTING

Kogi State is in the cemtral region of Nigeria. It is popularly called the confluence state as Lokoja, the state capital is the confluence of the rivers Niger and Benue. The state was created on 27th August, 1991 from parts of Benue and Kwara states. It has a land mass of 29,833 km2 (11,519 sq mi). Kogi State is bounded by the Federal Capital Territory and Niger to the North, Nassarawa to the North East, Benue to the East, Enugu to the South East, Anambra to the South, Edo to the South West, Ondo Ekiti and Kwara to the West.

Kogi state geological setting combines the two major geological environments in Nigeria - crystalline basement complex and sedimentary basin. The central and western flank is predominantly made up of the crystalline basement complex with showing outcrops of rocks Migmatite- Gneiss, granite-gneisses granites, granodiorites, syenites, monzonites, gabbro and charnockites, phylites, schists, pelites, quartzites, marbles and amphibolites. The eastern flank of the State is predominantly sedimentary basin made up of sedimentary rock and alluvium forming cretaceous to recent sediments bounded by the Anambra basin, with similar geology as Benue trough [4]. Figure q is a locational map showing Kogi state on the Nigerian map. Figure 2 is a generalised geological and mineral map of Kogi State. Table 1 shows the location of various minerals in Kogi state.

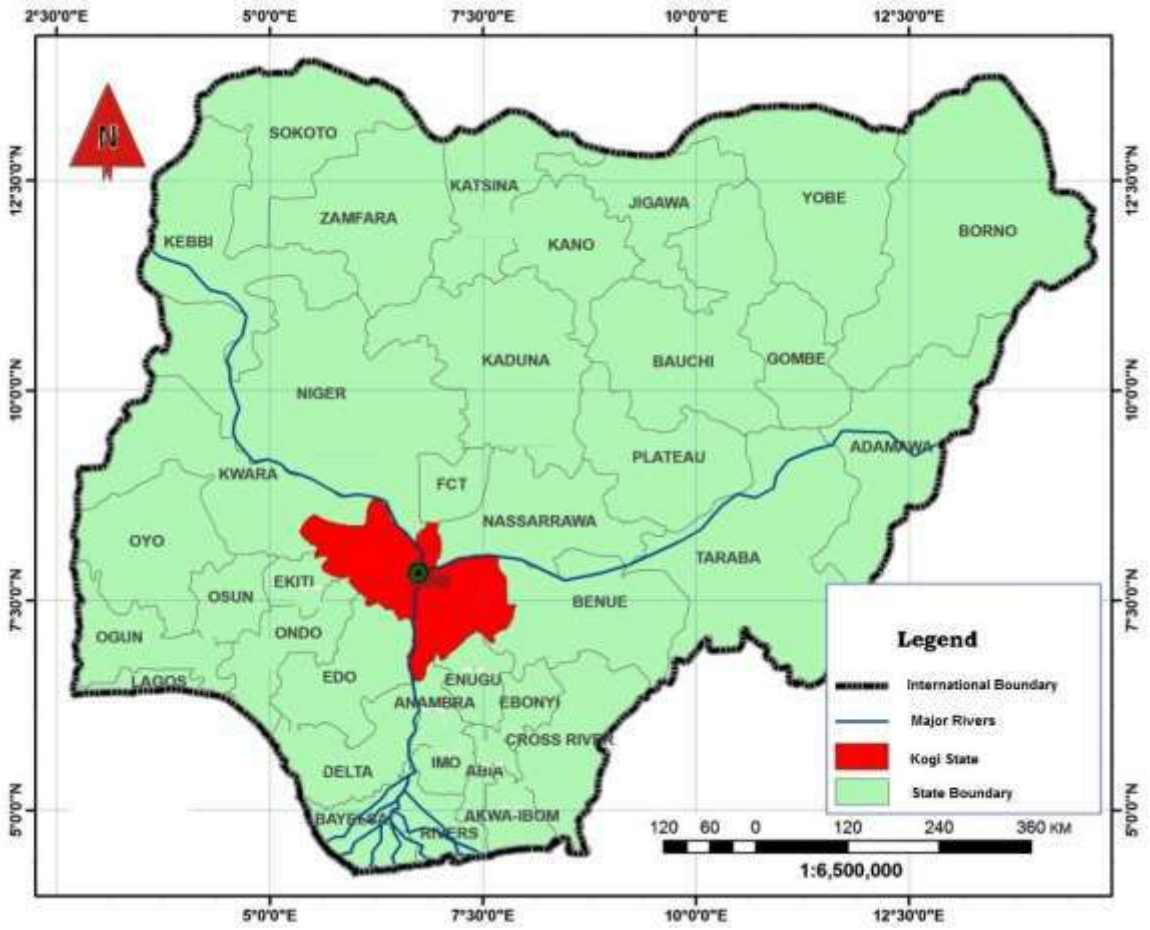

Figure 1: Locational map of Nigeria showing Kogi State [5].

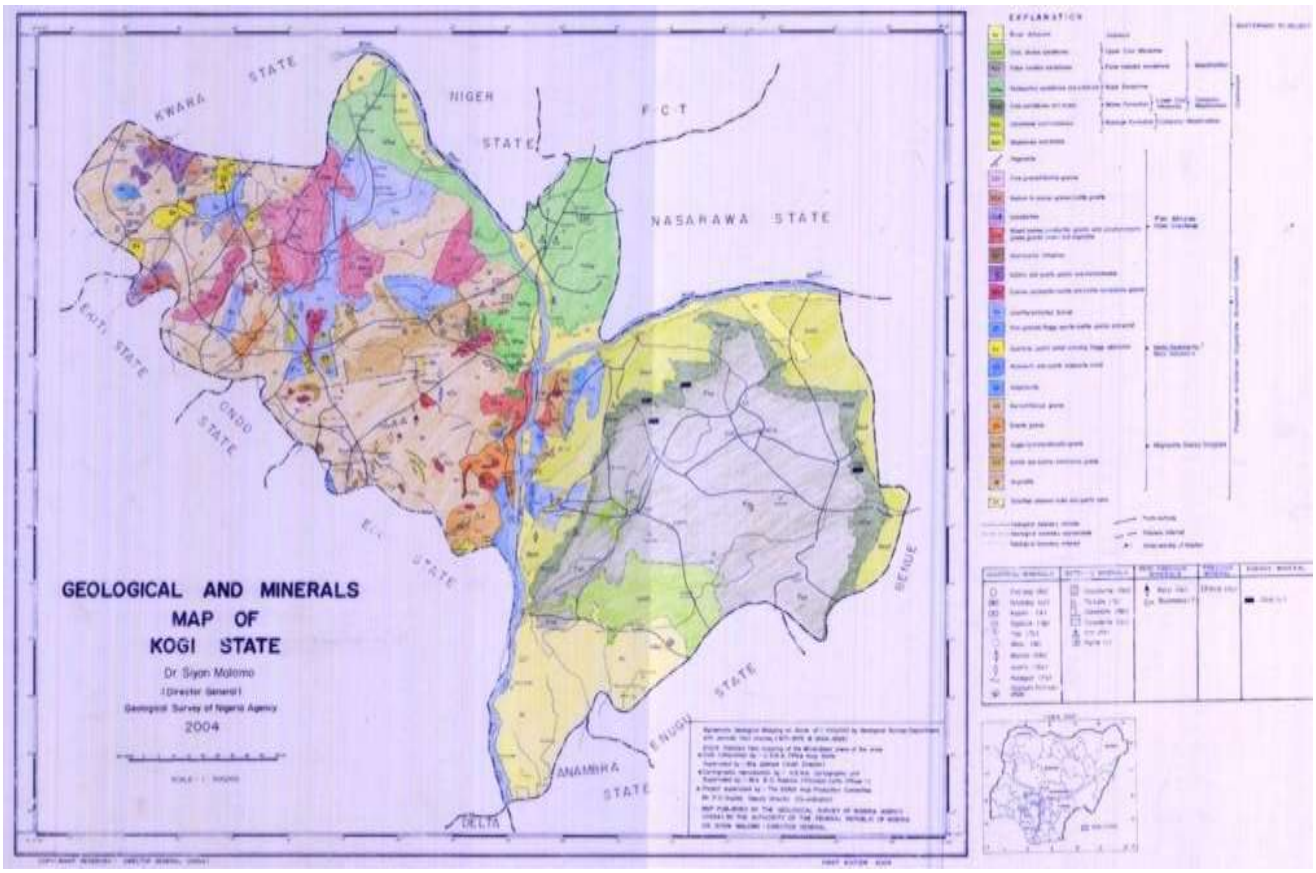

Figure 2: Generalized Geological and Mineral map of Kogi State [6].

Table 1 Kogi state minerals and their location

S/n	Mineral	Location	Local Govt. Area
1	Beryl	Ikoyi	Ijumu
		Aku	Adavi
2	Cassiterite	Okoloke	Yagba West
3	Clay	All over the State	
4	Coal	Odokpono	Ankpa
		Okobo	Ankpa
		Odoagbo (Okaba)	Ankpa
		Ogboyaga	Dekina
		Okpakiri	Dekina
		Dekina	Dekina
5	Columbite	Isanlu-Esa	Yagba West
		Okoloke	Yagba West
		Odo-Eri	Yagba West
		Ejiba	Yagba West
		Iddo	Yagba East
		Takete-Isao	Yagba East
		Idibo	Ajaokuta

6	Feldspar	Isanlu-Esa	Yagba West
		Egbe	Yagba West
		Osara	Adavi
		Aku	Adavi
		Zariaji	Adavi
		Lokoja	Lokoja
7	Fire Clay	Ahoko-Koto	Kogi
8	Garnet	Isanlu	Yagba East
		Takete-Isao	Yagba East
		Odo-Ara	Yagba West
9	Gold	Okolom	Yagba East
		Dogondaji	Yagba East
		Odogbe	Yagba East
		Okoloke	Yagba West
		Ejiba	Yagba West
		Katcha Katcha	Omala
10	Granite	All over the western flank of the State.	
11	Iron Ore	Itakpe	Adavi
		Ajagbanoko	Adavi
		Agbado-Okudu	Lokoja
		Agbaja	Lokoja
		Oshokoshoko	Lokoja
		Tajimi	Lokoja
		Ebiya	Ajaokuta
		Koton-Karfi	Kogi
12	Kaolin	Agbaja Plateau	Lokoja
		Emu	Lokoja
		Agbaja Hill	Bassa
		Angba	Igalamela/Odolu
13	Magnetite	Agbaja Plateau	Lokoja
		Tajimi Ridge	Lokoja
		Patti Ridge	Lokoja
		Gboloko	Bassa
		Akpogu	Mopa Muro
14	Marble	Oyo-Iwa	Lokoja
		Jakura	Lokoja
		Okoloke	Yagba West
		Ekinrin-Adde	Ijumu
		Osara	Adavi
		Ubo	Adavi
		Itobe	Ofu
		Mopa	Mopa Muro
15	Mica	Egbe	Yagba West
		Isanlu-Esa	Yagba West

		Idofin	Yagba East
		Zariaji	Adavi
		Aku	Adavi
		Lokoja	Lokoja
16	Muscovite	Isanlu-Esa	Yagba West
		Idofin	Yagba East
		Aku	Adavi
		Zariaji	Adavi
17	Quartz	Isanlu-Esa	Yagba West
		Idofin	Yagba East
		Aku	Adavi
		Lokoja	Lokoja
18	Silica Sand	All over the State	
19	Talc	Ejiba	Yagba West
		Okolom-Isanlu	Yagba East
		Odogbe-Isanlu	Yagba East
		Iye-Isanlu	Yagba East
20	Tantalite	Idofin	Yagba East
21	Tourmaline	Okoloke	Yagba West
		Odo-Eri	Yagba West
		Idibo	Ajaokuta

KOGI STATE MINERALS AND THEIR USES

The minerals of Kogi state if utilized could engage production activities and industrial revolution, small and medium scale entrepreneurship in mineral extraction and processes are viable ways of changing the economic landscape, create jobs for the people and lead to industrial growth. Akongwale et al (2013) atudies the significance of solid minera; development and carried out analysis on the role of solid minerals on economic diversification, by employing both qualitative and quantitative (descriptive) analysis, their study revealed that the solid mineral sector has the potential to contribute tremendously to the economy of the nation. Specifically, the study reveals that development of the solid mineral industry could help to eradicate poverty through massive job creation; especially, with its forward linkage with several other sectors of the economy. Most importantly, harnessing mineral resources could help alleviate most of the problems associated with "enclave" nature of the economy that has for too long being dependent or rather vulnerable to fluctuations in global oil prices. To realization the full potentials of of mineral resources, there is ned to strengthen the existing solid mineral development policy and create an enabling environment for the private sector and local as well as foreing investor to take the lead in the solid mineral sector.

Certain empirical studies have revealed that the mineral sector has been viewed as one of the key drivers of economic growth, development and transformation [7] [8] [9] [10] [11] [12]. (Adeniyi et al, 2013; Reynolds, 1979; Roderick, 2001; Alison-Madueke, 2009; Bridge, 2008; Akongwale et al, 2013). A description and usage of minerals is done below [13] [14].

Beryl: Beryl is composed of beryllium aluminium silicate. It a hard, mineral which colour may be white, blue, green, pink or yellow. It is hexagonal, $Be_3Al_2Si_6O_{18}$, from which beryllium is extracted; principally occurs as granite pegmatite. It is a major gemstone; called emerald when green, called aquamarine when blue or bluish green, and morganite when pink.

Use: As a gem stone it is used for ornamentals and Jewries.

Location: Beryl is found at Ikoyi in Ijumu Local Government Area (LGA) and Aku in Adavi LGA. Both areas are underlain by migmatites.

Cassiterite: Cassiterite is a dark coloured mineral which consist of tin oxide, SnO_2, as the major tin ore. Also known as tin-ore, cassiterite is a metalliferous mineral associated with hydrothermal veins and in

pegmatites. Some cassiterite deposits occur in placers or in granites.

Use: Tin is a well sought metal and used in numerous industrial processes throughout the world. Its usage is wide as a protective coating for copper vessels; it is also used in the form of tinplate for various metals for manufacture of tin cans and other similar articles. Tin and copper are used in the production bronze the common alloys; used for solder (tin and lead), and type metal (tin, lead, and antimony). It is also used in the aerospace industry as an alloy with titanium, also used as an ingredient in making insecticides. Stannic sulphide, also known as mosaic gold, is used in powdered form for bronzing articles made of plaster of paris or wood. Its compounds are used in dyeing and fire-proofing.

Location: The mineral is found is Okoloke in Yagba West LGA.

Clay: Clay is naturally occurring material composed primarily of fine-grained minerals, which show plasticity through a variable range of water content, and which can be hardened when dried and/or fired.

Fire Clay: Fire clay also known as refractory clay is a durable clay that can withstand great heat. In other words, it is a clay that can withstand high temperatures without disintegrating or turning pasty. They are non-plastic clays, composed dominantly of kaolinite with illite, quartz and carbonaceous material. Fire clays from where surface conditions permit most minerals, except kaolinite and illite, to be leached out.

Use: The uses of clay and clay products are too numerous to list completely. In domestic life clay is used in pottery, earthenware, china, cooking ware, vases, ornaments, plumbing fixtures, porcelain stoves, tiles, fire kindlers, oilcloths, linoleum, wall-paper, scouring soaps, and polishing bricks. It even finds a place as an adulterant in foods and medicine. In buildings it is used for building bricks, vitrified and enameled bricks, building and conduit tiles, tiles for floors, walls, and drains, copings, flues, chimneys pots, sewer pipes, and foundation blocks. In electrical industry it is used for conduits, cleats, sockets, insulators, and switches. In refractory ware it is used for fire brick, furnace linings, chemical stoneware, crucibles, retorts, glass-melting equipment, and saggar. Other important uses are for furling cloth, foundry sands, terra cotta, emery wheels, rubber crucibles, water conduits, paving bricks, septic tanks, railroad ballast, Portland cement, filtering oils, paper making, and innumerable minor purposes.

Location: Clay is found all over the 21 Local Government Areas of the State. Fire clay is found at Ahoko-Koto in Kogi LGA. The mineral is rich in hydrous aluminum silicate and is used widely to manufacture clay crucibles, fire bricks and furnace linings, and as a binder in molding sands.

Coal: Coal is a carbon-rich, combustible, stratified organic sedimentary rock composed of altered and/or decomposed plant remains of non-marine origin, combined with varying minor amounts of inorganic material. Coal deposits in the State are restricted to the eastern flank which lies within the Anambra Basin.

The coal deposits in Kogi State are of medium quality, noncoking and sub-bituminous.

Use: The coals in Kogi are suitable for electric power generation and as domestic fuel. They are also rich in resinous and waxy materials and are therefore suitable raw material for the chemical industry and also for use in the manufacture of plastics, when fractionally distilled. The coals are also good producer of gas fuel, and are suitable for complete gasification using the oxygen enriched steam blast process. They can also be processed to produce automotive fuel [15].

Location: Coal deposits in the State are found at Odokpono, Okobo and Odagbo (Okaba) in Ankpa LGA and at Ogboyaga in Dekina LGA.

Columbite: Columbite is an iron black, often iridescent, orthorhombic mineral oxide of niobium, tantalum, iron, and manganese $(Fe,Mn)(Nb,Ta)_2O_6$, with varying proportions of niobium and tantalum. When the proportion of tantalum exceeds that of niobium, it is called tantalite. Columbite is the principal commercial source of tantalum and niobium. In most cases, columbite in the State occurs in association with tantalite. Most of the columbite in the State is concentrated in alluvial deposits. Few deposits occur with tinstone in granite and pegmatite.

Use: Columbite is used in the production of dental and surgical instruments, niobium metals, electrodes and alloys.

Location: Columbite is found at Isanlu–Esa, Okoloke, Odo Eri and Ejiba in Yagba West LGA; Iddo and Takete-Isao in Yagba East LGA; and Idibo in Ajaokuta LGA.

Feldspar: Feldspar is an aluminosilicate mineral containing varying proportions of calcium, sodium, potassium, and other elements. It is the most important group of rock-forming minerals that make up about 60% of the Earth's crust. Feldspars are essential constituents of most igneous rocks; the kind and amount of feldspar present is used in classification. They frequently occur in metamorphic rocks and in many sedimentary rocks, more commonly in the arenaceous rocks than argillaceous. The type of feldspar most common in the State is potassium-rich feldspar (K-feldspar).

Use: Feldspar is used in glass, pottery, ceramics, filters in plates and paints.

Location: Large deposits of feldspar occur at Isanlu-Esa and Egbe in Yagba West LGA; Osara, Aku and Zariaji in Adavi LGA; and Lokoja the State Capital.

Garnet: Garnet is a variously coloured crystalline silicate mineral. In other words, ii is a mineral that belongs to the family of silicates of iron, magnesium, aluminum, calcium, manganese, and chromium, which are built around independent tetrahedral and appear commonly as distinctive 12-sided, fully developed crystals. It is common in metamorphic rocks (gneisses and schists and some types of contact metamorphism) and is stable across a wide range of temperatures and pressures. It occurs in some mantle xenoliths. Garnet has a vitreous luster and is found in all colours but blue.

Use: It is widely used as a gemstone.

Location: Garnet is found at Isanlu and Takete-Isao in Yagba East LGA and Odo-Ara in Yagba West LGA.

Gold: Gold is a soft, heavy, corrosion-resistant, yellow metallic element that is highly valued, found in underground veins and alluvial deposits. It occurs principally as a native metal but may also be alloyed with silver, copper and other metals. Gold occurs in hydrothermal veins with quartz and various sulphides; disseminated in submarine massive effusive and in placers or nuggets, fines, and dust. Although a rare element, gold is widely distributed in nature. Gold occurrence in the State is restricted to the schist belt. Most gold deposits in the State occurs as a native gold (gold dust) – concentration as placer along or close to old river beds. Few deposits also occur in quartz-veins and in pegmatites and in some areas underlain by the Basement Complex.

Use: Gold is used in coinage, jewelry, alloys, decoration, dental work, plating, and for coating certain space satellites. It is a standard for monetary systems in many countries.

Location: Large deposits of gold occur at Okolom, Dogondaji and Odogbe in Yagba East LGA; Okoloke and Ejiba in Yagba West LGA; and Katcha Katcha in Omala LGA.

Granite: Granite is a coarse-grained igneous rock composed of feldspar (usually potash feldspar and oligoclase) and quartz with a small amount of mica (biotite and muscovite) and minor accessory minerals, such as zircon, apatite, magnetite, ilmenite, and sphene. Biotite and/or hornblende are common mafic minerals. It is the most extensively occurring igneous rock.

Use: Granite is used in road and building construction, office and home furnishing, ornamental and monumental purposes.

Location: Large deposits of granite are found all over the western flanks of the State.

Iron Ore: Iron ore is a ferruginous rock containing one or more minerals from which metallic iron may be profitably extracted. The principal ore of iron ore found in the State are hematite and magnetite. They are dark grey to black heavy oxide of iron. They occur within the Basement Complex region of the State. They are mostly localized within the gneiss-migmatite-quartz complex.

Use: Iron ore is used in the manufacture of industrial machines, alloys, tools, civil and construction works, ship building, rails, automobiles, air crafts, office and household products.

Location: Areas in the State where iron ore are found include Itakpe and Ajagbanoko in Adavi LGA; Agbado-Okudu, Agbaja, Oshokoshoko and Tajimi in Lokoja LGA; Ebiya in Ajaokuta LGA; and Koton-Karfi in Kogi LGA.

Kaolin: Kaolin is aluminous mineral of the kaoliniteserpentine clay mineral group. The mineral is soft and white in colour. It has tendency of becoming plastic when wet and hardened when dried or fired.

Use: The mineral is used in ceramics, medicines, coated paper, tooth paste, cosmetics, paint, rubber, adhesives, chalks and fertilizer. It is also used as drilling mud in petroleum industry.

Location: Kaolin occurs at Agbaja Plateau and Emu in Lokoja LGA; Agbaja Hill in Bassa LGA; and Angba in Igalamela/Odolu LGA.

Magnetite: Magnetite is iron oxide, Fe_3O_4 black and strongly magnetic mineral. It is an ore of iron, although it can be found in the form of octahedral steel-black crystals with a metallic luster, it occurs more commonly as compact and granular masses. It is a common accessory mineral in igneous rocks and can be concentrated by magmatic segregation forming large orebodies, often with a high titanium content and is plentiful in contact metasomatic conditions.

Use: Magnetite is a major source of iron.

Location: Magnetite is found at Agbaja Plateau, Tajimi Ridge and Patti Ridge in Lokoja LGA; Gboloko in Bassa LGA; Akpogu in Mopa Muro LGA; and Ebiya in Ajaokuta LGA.

Marble: Marble is a fine- to coarse-grained metamorphic rock consisting mainly of recrystallized calcite ($CaCO_3$) and/or dolomite [$CaMg(CO_3)_2$]. It is a metamorphosed limestone. It has colourless streaks resulting from impurities such as quartz or dolomite in the original limestone.

Use: Marble is used in the manufacture of glass, paints, lime, cement, ceramics, iron and steel refining, bleaching powder, calcium carbide, chemical and pharmaceutical products, fertilizer, rubber and plastics, soap and detergent. It is also used in agriculture for life stock concentrates and land fertility, building and furnishing, wall cladding, paladiana, monumental and ornamental items.

Location: Large proved reserves of marble deposits occur mostly in the western flank of the State at Oyo-

Iwa and Jakura in Lokoja LGA; Okoloke in Yagba West LGA; Ekinrin-Adde in Ijumu LGA; Osara and Ubo in Adavi LGA; Itobe in Ofu LGA; and Mopa in Mopa Muro LGA.

Mica: Mica is a group of monoclinic phyllosilicate minerals characterized by their platy habit, perfect basal cleavage and the elastic properties of the cleavage flakes. The principal mica minerals are muscovite, biotite, phlogopite and lepidolite. Micas occur in a wide range of igneous and metamorphic rocks and some sedimentary rocks. Large crystals of mica are typically mined from granitic pegmatites. Two types of mica commonly found in the State are muscovite (white) and biotite (black). They are characterized by perfect cleavage, readily split into thin elastic plates.

Use: The mineral is widely used in electrical and heat insulators, lamp shield, lubricant, paints, Christmas trees snow and filters in plastics, ceramics, wall papers and decorations

Location: Mica is found at Egbe and Isanlu–Esa in Yagba West LGA; Idofin in Yagba East LGA; Zariaji and Aku in Adavi LGA; and Lokoja the State capital.

Muscovite: Muscovite is a common mica mineral consisting of potassium aluminum silicate. It also known as white mica or potassic mica. Muscovite is a mineral of mica group, $KAl_2[AlSi_3O_{10}](OH)_2$, colourless and transparent in thin cleavage flakes but transluscent silvery or pale shades of yellow, brown or green in thicker crystals. Muscovite is a widespread and common rock-forming mineral, especially in pegmatite, granite and low-or medium- to high- grade metamorphic rocks (greenschist and amphibolites facies).

Use: Muscovite is used as insulating material in the manufacture of electrical apparatus, particularly vacuum tubes. Scrap mica, obtained as waste material in the manufacture of sheet mica, is used as a lubricant when mixed with oils and as a fireproofing material.

Location: Areas in the State where muscovite is found are Isanlu-Esa in Yagba West LGA; Idofin in Yagba East LGA; and Aku and Zariaji in Adavi LGA.

Quartz: Quartz is a hard, usually colourless and transparent crystalline mineral. It is second most common of all minerals, composed of silicon dioxide, or silica, SiO_2. It is distributed all over the world as a constituent of rocks and in the form of pure deposits. It an important rock-forming mineral and is an essential constituent of igneous rocks such as granite, rhyolite, and pegmatite, which contain an excess of silica. In metamorphic rocks, it is a major constituent of the various forms of gneiss and schist; the metamorphic rock quartzite is composed almost entirely of quartz. Quartz forms veins and nodules in sedimentary rock, principally limestone. Sandstone, a sedimentary rock, is composed mainly of quartz.

Use: The mineral is used in electronic equipment (radio oscillation), glasses, lenses, prisms, refractory materials, porcelain, oscillation plate and in building construction.

Location: Quartz is found all over the western flank of the State mostly at Isanlu-Esa in Yagba West LGA; Idofin in Yagba East LGA; Aku in Adavi LGA; and Lokoja the State capital.

Silica Sand: Silica Sand is a sand containing a high percentage of quartz.

Use: Silica sand is used in road and building constructions, ceramics and glass among others.

Location: Large concentrations of silica sand occur all over the State mostly along river channels both in the western and eastern flanks of the State.

Talc: Talc is very soft mineral consisting of hydrated magnesium silicate, $Mg_3Si_4O_{10}(OH)_2$, with a hardness of 1 on the Mohs Scale, that feels soapy when handled. It occasionally occurs as pale apple green, grey or white triclinic crystal but more commonly is compacted, forming foliated, fibrous or granular masses; in soapstone it is dark grey or dark green. It is an alteration product of magnesium silicates or ultramafic rocks and is also formed by metasomatism in pure dolomitic marbles.

Use: Talc is used in cosmetics, ceramics, paper, paints, pharmaceuticals, plastics, rubber, and textiles, among others.

Location: Large deposits of talc are found at Ejiba in Yagba West LGA; Okolom, Odogbe and Iye in Yagba East LGA.

Tantalite: Tantalite is a reddish black mixed oxide mineral, $(Fe,Mn)Ta_2O_6$, containing tantalum, iron, and manganese. It is the principal ore of tantalum. Tantalite is isomorphous with columbite and occurs in pegmatites. It is highly resistant to corrosion.

Use: As a result of its resistance to corrosion, tantalum is used in surgery for skull plates and in air craft building. It is also used in the manufacture of special alloys, electrodes and tantalum metals.

Location: Large concentrations of tantalite in the State occur in certain alluvial deposits associated with columbite. It occurs at Idofin in Yagba East LGA.

Tourmaline: Tourmaline is a silicate mineral of boron and aluminum with sodium, calcium, fluorine, iron, lithium, or magnesium formed at high temperatures and pressures through agency of fluids carrying boron and fluorine. In other words, it is a group of hexagonal borosilicates minerals with variable chemical composition occurring as prismatic crystals or aggregates of parallel or radiating individuals. Tourmaline is a common accessory mineral in igneous and metamorphic rocks, and very common in pegmatites, where it sometimes occurs in crystals of enormous size. This diachronic gemstone comes in many different colours.

Use: The mineral is used in electronics, optics and as gemstone.

Location: Tourmaline is found at Okoloke and Odo-Eri in Yagba West LGA; and Idibo in Ajaokuta LGA.

CONCLUSION

Kogi state is richly endowed with various mineral resources which are of great importance to the nation. They provide raw materials for industries such as manufacture of paints insecticides, plastics and drugs, limestone is used in the cement production factories, etc.

The possession of minerals could also enrich foreign earning, enhance the standard of living of the people; provide employment; lead to the acquisition of new skill; increases internally generated revenue and generally contribute to the growth of towns and cities. The development of town like Enugu (known to be from coal) and Jos (from Tin) are good examples of minerals driven development. Kogi state can harness her mineral wealth to impart on the socio-political development of the people.

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