

Mineral Prospecting Potentials Of Osun State.

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Abstract

It has been discovered that Nigeria is endowed with a lot of mineral resources widely distributed in virtually all the states in the country. In Osun State almost all the local governments has more than one mineral resource that can be obtained from them. Despite the occurrence of mineral resources in the state, not all are of economic quantity and this is the main problem this study seeks to solve. In this study, minerals that are of economic quantity are separated from the minerals that are not of economic quantity through the use of scientific method. The mineral resources that are found in Osun State were hypothesized, the estimated reserve of each mineral resources that are of economic quantity were also analyzed. The findings at end of this study proved that only the following minerals are of economic quantity in Osun Slate: Gold, Talc, Granite, Tinstone, Feldspar, Kaolin, Columbite, and Clay.

Keywords: Mineral Prospecting Potentials Resources Economic quantity

Introduction

A mineral is any naturally occurring inorganic element or compound having an orderly internal structure and well defined chemical composition, within narrow limits. In addition a mineral exhibits characteristics and diagnostic crystal form, mechanical, optical, electrical and chemical properties. A mineral occurrence is an anomalous but natural concentration of minerals. A mineral deposit is a mass of natural occurring mineral material, for example; metal ores or non-metallic minerals usually of economic value whose extraction is technologically feasible and viable. (Bates and Jackson, 1984).

The definition in this context is elastic and includes coal, hydrocarbons such as mineral fuels, natural gas, oil shale and tar sands and even water. Mineral resource appraisal ought to be routinely conducted to aid the State or Local Government Development Plans. The mineral resource potential of a state or nation includes both known and unknown rocks of minerals of commercial value either in the present or in the future (Zwartendly 1972).

It is this pre-requisite of "economic value" which transforms any mineral occurrence into a mineral deposit or resource. A rock is an aggregation of minerals either of one type of mineral or several types of minerals. These facts appear lost on planners and economic development experts in Nigeria. Mineral resources used in a geopolitical context refer to natural endowments used for the economic development, human emancipation and wealth creation.

Osun State is located in South-Western Nigeria within latitudes 6°50'N and 8° 10 'N and longitudes 4°00'E and 5°10'E. Osun State shares borders on the West and North-West with Oyo State; on the North and North-East with Kwara State; on the East and South-East with Ondo State and on the South-West with Ogun State and on the East and North East with Ekiti State.

Osun State covers approximately 8,500 km². The administrative headquarters is at Osogbo. There are 30 local government areas in the state. The population is between 3 and 4 million people. The state came into existence on August 27, 1991 having been created out of the old Oyo State, which itself was carved out of the Western State of Nigeria in 1976.

The prevailing climate is distinctly tropical with four climatic seasons (Tloetje, 1976);

- (i) The long dry or harmattan season (November - March)
- (ii) The long wet season (March — July)
- (iii) The short dry season (July — August)
- (iv) The short wet season (August — November)

Osun State is well drained by fairly large rivers and their tributaries, some of which originate from outside the boundaries of the state. The large rivers are the River Osun which is worshipped at Osogbo. There is a dam on River Osun at Asejire, which supplies the city of Ibadan (Capital City of Neighbouring Oyo State) with more than 70 percent of its water River Shasa and River Owena. These rivers together with their tributaries provide an adequate drainage network for the state and should provide ready sources of water for domestic and Industrial purposes.

Osun State is underlain by Precambrian rocks of the basement complex of Nigeria. Several varieties of these rocks possess appreciable degrees of economic mineralization. In Osun State deep weathering profiles, erosion surfaces and alluvial deposits have accumulated important mineral deposits such as laterites, talc and gold in stream sediments.

In Osun State the mineral resources potentials found are Gold, Talc, Feldspars, Cassiterite, Columbite, Granite, Mica, Iron ore, Kaolin, Tourmaline, Aquamarine e.t.c. Though not all these minerals are of economic quantity but their discoveries have led to further discoveries of more minerals. Mineral reserve presupposes that some type of physical measurement or evaluation has been made of the grade and amount of mineral concentration in place and that profitable extraction now or in the near future is technologically feasible (Ajayi, 1985).

In 1941 due to prospecting done, Gold was discovered in Ilesha and it was exploited but only the alluvial deposit was exploited. It was discovered that with more systematic prospecting more deposits of gold could still be found. The discovery of economic deposits of gold in the South East of Ilesha led to the discovery of other minerals in Osun State.

Statement of the Problem

Despite the fact that Nigeria is blessed with a lot of mineral resources in which Osun State is among the states. It was noted that there are still some lapses in the full utilization of these mineral resources. Most of the mineral resources are not of economic quantity and some are that are of economic quantity, their locations, minimum reserve are yet unknown.

However, for investment purposes, there is the need to have adequate information on the locations, minimum reserves, and mineral resources that are of economic quantity in Osun State

Objective of the Study

The objective of this study is to ascertain the mineral potentials and their prospecting method in Osun State. The specific objectives are to;

- i. Reveal the location of these minerals, their importance and role to the Osun State Government, their measuring unit and price which is determined by the supply of and demand for these minerals.
- ii. Assess the minerals that are of economic quantity which the state government and private investors can invest into.
- iii. Show the minimum reserve available of minerals that is of economic quantity in Osun State.

Research Questions

The study proffers solutions to the following research questions;

- i. What mineral potentials can be found in the state?
- ii. What are the minerals that are economic quantity which the state government and private investors can invest into?
- iii. Do benefits come through the exploitation of these mineral?
- iv. Do these minerals contribute to the growth and development of the state?

Statement of Working Hypotheses

The following hypotheses were drawn for the purpose of this study

Hypothesis 1 (Precious Metals)

Gold and silver are found to -be of economic quantity in Osun State.

Hypothesis 2 (Gem Stones)

Tourmaline, Aquamarine, Garnet, Stauroljte and Zircon, Rutile are found to be of economic quantity in Osun State.

Hypothesis 3 (Metallic Minerals)

Columbite, Iron-ore Cassiterite are found to be of economic quantity in Osun State.

Hypothesis 4 (Industrial Mineral)

Talc,-Feldspar, Kaolin, Granite, Clay, Laterite, Silica sand, Sillimanite, Mica and Quartz are found to be of economic quantity in Osun State.

REVIEW OF RELATED LITERATURE

Geological Setting of Osun State

Various types of rocks occur throughout Osun State. The geology of most of Osun State is covered by Iwo Sheet 60 on a scale of 1:250 000 (Geological Survey of Nigeria, 1965). The structural features exhibited by rocks of the area include foliation in the gneisses; lineation; folds; faults and joints. Rocks of the basement complex have been subjected to deformation during several orogeny cycles and it is difficult to differentiate between structures belonging to the separate periods of deformation (De Swardt, 1953).

Minor folds are very common in the gneiss and schists and from all available evidence (Jones and Hockey, 1964; Grant, 1970 and Rahaman, 1974), the basic geological structure of South-Western Nigeria is a complementary anticlinorium and synclinorium with northwards plunging axes. The quartzites did not escape the folding and refolding episodes which affected the entire region (Ajayi and Adegoke-Anthony, 1988).

Major faults are rare in the basement complex generally, although there is a dominant fault in the area — the Iwara fault which seems to control the mineralization within the amphibolite complex. “The talc-tremolite and marginal chlorite schists of the amphibolite complex occur along shear zones and faulted junctions which may belong to the porphyritic granite cycle of deformation”

(De Swardt, 1953, pg. 33). Furthermore, the granitisation which led to formation of potash granite gneisses in the variegated gneisses around Iwara can probably be related to the Iwara Fault. Jointing is a common feature in the area and is of tectonic origin. The major effects of these joints are reflected in structurally controlled drainage pattern and parallelism of the dolerite intrusions (Adekoya, 1977).

The rocks of the basement complex in the area have been subjected to intense regional metamorphism in which shearing stress was the dominant control resulting in the absence of minerals of high metamorphic grade. Magmatism is widespread throughout the area reflected by rapid alternation of granite, biotite gneiss and biotite schists which grade into one another. Selective granitisation has resulted in biotite-rich layers in the gneisses being converted into porphyritic granite, while the leucocratic bands have been converted to aplitic granite.

The various rock types in Osun State can be attributed to many factors. Several episodes of shearing, faulting and metamorphism have already been recognized. Selected granitisation and localization of intrusive bodies coupled with rock transformation at shear zones have resulted in the preferred mineralisation patterns noticeable throughout the state.

Weathering and Erosion of Osun State

The process of rock weathering is important for natural resources (Faniran and Jeje, 1983). Throughout Osun State the development of deep weathering profiles, erosion surfaces and alluvial deposits have economic significance for accumulation of important mineral deposits such as laterites, talc and the concentration of gold in stream sediments.

Three erosion surfaces have been recognized—older, intermediate and younger and are responsible for the distribution of gold-bearing deposits in the area. The difference in elevations between the older and younger erosion surfaces is not more than 30m but it is significant. There have been two periods of laterite formation, the older laterites are coarse, porous rock found on the top of the older erosion surface while the younger laterites are restricted to the intermediate erosion surface.

The alluvial and alluvial deposits are confined to the younger erosion surface and can be up to 7m thick in places. The basal grits consist of angular quartz, gold, tourmaline, limonite, staurolite, garnet, rutile and zircon.

Except for the hilly areas east of Ikirun, the depth of weathering is considerable and probably extends to over 30m in places. The main effects of weathering are kaolinisation of the feldspars and leaching of the mobile constituents to form laterites at the top of the profile.

The colour and composition of the laterite depend on the nature of the parent rocks. Laterites formed on the amphibolite and biotite schists are dark brown in colour and contain a high percentage of Iron. On the other hand, laterites formed on granitic rocks are light, yellowish brown, gritty rocks which contain a much smaller proportion of Iron (De Swardt, 1953).

Weathering also plays a very significant role in the accumulation of groundwater in the area. Extensive deep weathering profiles are exploited for water supply through shallow dug wells by the rural population. “Even in towns and cities, shallow wells, dug in the regolith, provide the only stable source of water supply” (Ajayi and Adegoke-Anthony, 1988, pg. 229).

From History, it was discovered that only Solid Minerals exist in Osun State with no traces of liquid or semi liquid minerals. Below, as earlier said minerals found in Osun State are listed below.

Mineral Occurrence in Osun State

- A. Precious Stones / Semi Precious Stones
- B. Metallic Minerals — Heavy Minerals
- C. Non-Metallic Minerals or Industrial Minerals

Precious Stones / Semi Precious Stones

Minerals classified under precious stones and semi-precious stones or gem stones are Gold, Aquamarine, Tourmaline, Amethyst, Topaz. Different locations have been discovered where these minerals exist. In case of gold, the exact location that it has been discovered are Igila, Itaguinodi, Oluwu village, Iperindo, Iregun, Okulu Omo, Aiyetoro, Eyingbin village, Ashafe, Eyinta village, Igangan village, Okepo village, Ipole village, Ajoku village all in Atakunmosa East and Atakunmosa West.

Also gold can be found in Ife central, Ife East, Obokun. There exist different mining centers in the locations mentioned above and exploration is in progress because there exist economic alluvial deposit in all these areas. In the case of other minerals, only alluvial deposits are indicated. Also primary deposits are indicated in the case of gold.

Tourmaline can be found in Irewole local government. Aquamarine can be found in Boripe, Ayedaade. Precious stones / semi-precious stones can be used as ornamental (Jewellery) Gold can be used for stability of paper currencies, in alloys with Platinum, gold is used in dentistry, gold is used as a coating on over craft engine. No exact figures for the deposits.

Metallic Minerals or Heavy Minerals

Minerals classified under metallic minerals are columbite (Tantalite), cassiterite (Tine ore), and Iron ore. Different locations have been discovered where these minerals exist. Columbite can be found in Atakunmosa West, Ife East. Cassiterite can be found in Atakunmosa East and West, Ife central. Iron ore can be found in Ejigbo, Ola Oluwa. There exist different mining centers in all these locations above, in the case of Tantalite mining center is in Ifewara, columbite is been mined in Iperindo.

No exact figures of deposits available but alluvial deposit are indicated concerning these minerals. Cassiterite can be used as protective coating for copper and steel. Also in soldering brass and galvanised metal sheet. Columbite is used in special alloys required in aircraft engines; heavy construction equipment.

Tantalum is used as electronic emitter in electronic tubes; jet engine turbine bladder rocket nozzle coating. Iron ore is used in steel rolling, deposit discovered in a village called Isundurin in Ejigbo Local Government.

Non-Metallic Minerals or Industrial Minerals

Mineral classified under non-metallic minerals are Talc, Kaolin, and Granite also known as Dimension stones, Feldspar, Mica, Clay (Laterite), Silica Sand (Gravel). Different location have been discovered where these minerals exist.

Talc is found in Ifelodun Local Govt, Atakunmosa East, Irewole, mining is done in Iperindo. Also Talc is found in Osogbo in a village called Ota Efun. There are indications of alluvial deposit which are of economic deposit. Resources of about 20 million metric tons are available in two locations. Processed talc is used as extender in paints, as lubricant in paper manufacture, as insecticides carrier, as rice polishing powder, in wall tile and other ceramic products.

Kaolin is found in Ifedayo, Ife central, Ilesha with mining center at Iperinde at Atakunmosa Local Government also mining center is at Iwaraja in the same local government. There are indications of alluvial deposit, which are of economic deposit. Resources of over 2 million tones are available Kaolin is used as Filters in paper paint, adhesive, plastic, rubber, drug preparation ceramics.

Granite is a solid mineral found to be available all over the state. Mining center is at Ikire, Olokusa in Egbedore Local Government. There are indications of Economic deposit of over 10 million tones. Granite is used as aggregates in construction industry, polished stones as floor tiles. Feldspar is found to be available in Atakunmosa East, Ede with mining center in Irokun. There are indications of economic deposit of metric tons in the two locations above. It is used in paints; tiles; glass and as scouring powders.

Mica is found in Ifedayo, irewole, Ayedaade local government. There is a mining center in Ilesha for mica because of recent discovery. There are indications of alluvial deposit and it can be used as insulator.

Clay is found in Atakunmosa East, Atakunmosa West Ede, Ifelodun, Ife North. There are indications and clay is used in paint, rubber and plastic, ceramics and refractory bricks industry and in construction works.

Prospecting

One of the most fascinating aspects of mining is the search for and discovery of mineral deposits. (Naturally concentrated or localized occurrences of useful minerals). This is termed Prospecting. In earlier times, prospecting was carried out by individual prospectors, using rule of thumb methods and a certain amount of intuitive knowledge, combined with a minimum range of tools and camp gear, in mineralized terrain. The general aim was to locate the outcrop of a vein or Lode, to expose it across its width, along its strike and for a limited depth (by sinlang pits at intervals). Many such outcrops were partly buried and had to be exposed by cutting 'costeans' laterally across the vein at intervals.

By sampling the exposed faced and having assays (analyses) made, the average grade of the deposit was roughly deduced. Except perhaps in region where arctic ice, desert sands or tropical rain forest exist, most outcropping mineral vein has already been discovered. For this reasons the role of the individual prospector is rapidly diminishing.

Taking gold as an example, when prospecting for vein gold, a prospector typically washed the gravels in stream beds in a gold pan, a manual 'tool' for separating heavy mineral particles from the lighter stream gravels and silt. Where evidences of gold collected in the pan, persisted, he would work his way up the stream bed, progressively planning along the way, in the hope of finding it source (the mother Lode) whose outcrop was often concealed by the weathering products of the hillside rocks.

The above are regarded as 'conventional' prospecting methods, though in recent years, more sophisticated methods have been evolved.

METHODOLOGY

Source of Data

The data used for the working hypotheses are;

1. The list of all mineral resources available in Osun State.
2. Total amount of proven reserves of the mineral resources that are of economic quantity.
3. The number of years that the mineral resources that are quantity will last before its supply finishes.
4. The level of the demand for and supply of the mineral resources that are of economic quantity.
5. The topography, weathering and erosion and the geological setting of Osun State.

Method of Data Collection

The methods used for data collection are through:

1. Journals and textbooks.
2. Oral Interview.
3. Encyclopedia of Social Sciences and Geology

Also data were collected from the following Ministries.

- a. Ministry of Commerce, Industries and Cooperative in Osogbo, Osun State
- b. Federal Ministry of Solid Minerals (Mines Department) in Osogbo, Osun State

Method Data Analysis

This is the technique used in evaluating the working hypotheses. The minimum reserve of the mineral that are of economic quantity will be determined given the number of the years the mineral can last before its supply finishes and the minimum quantity supplied per day. Using the formula below
Minimum reserve = $X \times 30 \times 12 \times 50$

- | | |
|----|---|
| X | Number of quantity supplied per day. |
| 30 | Average number of days in a month. |
| 12 | Number of months in a year. |
| 50 | Number of years the mineral will last before its supply finishes. |

The result will be the minimum reserve available in Osun State.

Justification for selecting X as quantity supply per day and 50 years of reserve availability will be stated.

PRESENTATION OF RESULT

This section present the result on the study carried out on each mineral and at the end of it all, these minerals were only found to be of economic quantity. Gold, Talc, granite, Kaolin (Clay), Feldspar, Mica, Columbite and Tantalite.

Before the discoveries were arrived at, we discovered that several mineral occurrences have been reported from the area now known as Osun State, prior to the creation of Osun State. The mineral map of Nigeria (Geological survey of Nigeria 1988) shows only the occurrence of gold, talc and kaolin in the area covered by

Osun State. However, other mineral occurrences have been reported in the literature both before and after the preparation of this map.

These are the known mineral occurrences in Osun Slate as compiled from the literature review Geld, Kaolin, Talc, Feldspar, Mica, Granite, Silica Sand, Clay, Aquamarine, Tourmaline, Topaz, Columbite, Tantalite, Iron-Ore, Cassiterite, Quartz, Rutile, Zircon, Sillimanite.

In this section only those minerals that have been proved and discovered to be of economic quantity will be discussed.

NOTE:- Only Solid Minerals exist in Osun State.

Gold (Au) in Osun State

Alluvial gold was first discovered in 1940 around Ilesha and Ife. Gold was first reported in September 1940 from the Owena River North of Ife-Ondo road. Later in December 1941, mining began South of Temogun. Between 1941 and 1952 over 50 ounces of gold were recovered from the stream sediments (De Swardt, 1953). The gold occurs as fine scales and dendritic aggregates in alluvial material.

The Gold is seldom visible in hand specimen, but occasional nuggets can be found. The gold was concentrated in stage, by removal of the other products of weathering and by river action. Practically every stream deposit in the Ilesha area carries traces of gold, even where the tributaries flow entirely over granite or muscovite deposits. Gold is measured in ounce or in grams. One oz is around 32.8 grams and grade is in carat. One grade is about 23.4 carat. The higher the carat, the higher the price. Recently it was discovered that Osun State's gold is second to the best in the whole world. Gold is used for stability of paper currencies, jewellery in alloys with platinum - it is used in dentistry and it is used as coating on aircraft engine.

The locations where gold have been mined in Osun State include Iperindo — Nigeria. mining corporation, Ijebu-Ife - Banlow Mines Limited, Ifewara in Ilesha, Ashafe village — Damson Onsumbare Co. Ltd, Okepo village Jumoke Property & Investment Company Limited, Afasagboye Coat Mining Limited, Eyingbin village — Double Prince Nig. Ltd, Igila village — Allied Minerals & Gold Mining and Co. etc. Today mining of gold continues on a commercial scale in Osun State, and exploration is still in progress.

Findings

In the course of this study work, it was discovered that over 20 million ounces of Gold occur in these local government in Osun State, Atakunmosa East; Atakunmosa West, Ife East. The quantity available was discovered to be exploitable over a period of 50 years at an economic rate of about 850 ounces supply per day.

Minimum availability in Osun State

850 x 30x 12x50

30 — No of days in a month

12 — No of months in a year

50 — No of years considered for the mineral to last i.e. years of reserves availability.

850 — Quantity of ounces supplied per day.

15, 300,000 ounces is the minimum available of Gold in Osun State.

Justification

The supply of Gold at an economic rate of 850 ounces per day is the only rate that can last Osun State for the period of 50 years and more without diminishing in quantity. With more discovery of Gold in the state, it can only increase 850 ounces supply per day but it never reduces it.

For this research work, a minimum of 50 years is considered to test a mineral to be of economic quantity and Gold in Osun State has been proved as a mineral that can last 50 years and more without wearing away.

Talc (MgSi₄ O₁₀ (OH)₂) in Osun State

Various talc bodies have been reported throughout the state. Impure talcs-schists are found in the larger amphibolite bodies. One body is located 1.5km South West of Iregun village in Obokun where the body of talc schist is approximately 5km long and 250m wide and is to be found along a major fault zone.

Talc is a secondary mineral derived from the hydration of magnesium silicates (such as olivine, enstatite, and tremolite) in basic igneous rocks. Talc is measured in tonnes and it cost less as a raw material but it yield high income. Talc has been discovered to occur in Ota Efun in Osogbo (Ota Efun - Yoruba Translation of Talc), Ifeloduii, Atakuiinosa East, Irewole Local Governments. Talc has been discovered to be of economic quantity and because of high demand which outweigh supply more investors are still needed.

Talc is a very important mineral and processed Talc is used as (i) extender in paints (ii) lubricant in paper manufacture (iii) insecticides carrier (iv) rice polishing powder (v) in wall tile and other ceramic products (vi) in the pharmaceutical and petroleum industries where it is used as coating or additive in lubricants. Resources of over 30 million metric tonnes have been discovered to be in existence in Osun State and mining is

presently done in Iperindo - Nigeria Mining Corporation, Ilesha etc. There are indications of talc as discovered all over the state.

Findings

In the course of this study work, it was discovered that over 30 million metric tonnes of Talc occur in Osun State. The quantity available was discovered to be exploitable over a period of 50 years at an economic rate of about 1,200 metric tonnes supply per day. Minimum availability in Osun State

1200 x 30 x 12 x 50

30 — No of days in a month

12 — No of months in a year

50 — Years of reserves availability.

1200 — Quantity of metric tonnes supplied per day.

Therefore 21,600,000 metric tonnes is the minimum available of Talc in Osun Slate.

Justification

The supply of Talc at an economic rate of 1200 metric tonnes per day is the minimum supply rate that can last Osun State for the period of 50 years and more without diminishing in quantity. It can only increase i.e. the tonnes supply per day as more discoveries is made and technology is improved. For this research work, a minimum of 50 years reserves availability is considered to test a mineral to be of economic quantity and Talc has been proved as a mineral that can last for 50 years and more.

Granite (Rocks) in Osun State

Granite has been discovered to be in existence all over Osun State and it is derived from rocks which a layman called mountain-. There are 3 types of rock in which granite is developed (i) igneous rock (ii) sedimentary rock (iii) metamorphic rock.

Most granite are formed from sedimentary rock which are blasted into different sizes depending on what the granites went to be used for. The site where rocks are being blasted into granite is called a **QUARRY** and there exist a lot of quarries in Osun State. There is no equilibrium in granite i.e. Demand is not met by supply because of low investors. Granite has been discovered to be of economic quantity and its measures in tonnes.

Granite is being mined in Olokusa Egbedore and in Ede local government - Irepodun & Sons Limited, Ayofe Quarry in Egbedore local government Ila local government etc. Inaolaji Builders Ltd. Ikire. Granite is used as aggregates in construction Industry, polished stones as floor tiles. It is used in building houses, bridges and construction of roads. Also it was discovered in the course of this research that granite could be used to cure rheumatism as proved by traditional doctors.

Findings

In the course of this study, it was discovered that granite can never be exhausted and it can last for thousands of years. No matter the quantity supplied per day, granite will still continue to exist forever and ever. Granite in Osun State is of abundance and more investors are still needed to take the Quarry license and start blasting.

Tinstone: Cassiterite (SnO₂) in Osun State

Cassiterite, also known as tinstone, is the principal ore of tin and is a brown or black tetragonal mineral. The only record in the literature is De Swardt (1953) who reported traces of tinstone in the heavy mineral concentrates from the streams draining the pegmatite complex around Osogbo and in a stream 1.5km West of Iregun village. Cassiterite is found in these local government Atakunmosa East, Atakunmosa West, Ife Central. Alluvial deposit are indicated in all these areas.

Cassiterite is used as protective coating for copper and steel, in soldering brass, galvanized metal sheet.

Findings

Though past history recorded that more than 2 tonnes (over 2000kg) of cassiterite have reportedly been recovered from alluvial sources (De Swardt, 1953). Also it was reported that not much is known of the occurrence and distribution of this precious mineral in Osun State.

In the course of this study, it was discovered that cassiterite (Tinstone) is one of the minerals in Osun State that is of economic quantity. It was also discovered that this mineral could last as many years as possible without wearing away.

It was also discovered that no exact figures of cassiterite deposits available because more discoveries can still be made. Investors are hereby advised to invest in the mining of cassiterite.

Feldspar in Osun State

Feldspar is one of the major mineral discovered to be in existence in Osun State. There are indications of feldspar in Atakunmosa East and Ede Local Government. Also in Ilesha there are indication of feldspar. Feldspar in the course of this research has been proven to be of economic quantity and mining is in progress.

Mining of feldspar is done in Aolas (Nig) Limited in Irokin town. Also mining is done in Iperindo - Nigeria Mining Corporation. Because of feldspar occurrence more discoveries are still in progress which will require more mining centers to be established by investors.

Feldspar is used in paints, ceramics, tile, glass and as scouring powders. Feldspar occurs in granite as tiny particles.

Findings

In the course of this study, it was discovered that there are economic deposit of about two million, metric tonnes of feldspar in Osun State. The quantity available was discovered to be exploitable over a period of 50 years at an economic rate of about 50 tonnes per day.

Minimum availability in Osun State.

50 x 30x 12x50

50 — quantity of metric tonnes supplied per day

30 — No of days in a months

12 — No of months in a year

50 — Years of reserves availability.

900,000 metric tonnes is the minimum available of Feldspar in Osun State.

Justification

Though more discoveries can still be made but the supply of feldspar at an economic rate of 50 tonnes per day for now is the minimum supply that can last Osun State for the period of 50 years and more without diminishing in quantity, it can only increase.

Kaolin in Osun State

Kaolin in Osun State has also been proven to be of economic quantity and mining is in progress in Iperindo - Nigeria Mining Corporation. Kaolin has been discovered to occur in Iledayo, Tie central, Ilesha local governments.

Kaolin is used as filters in paper paint, adhesive, plastic, rubber, Drug preparation, ceramics.

Findings

In the course of this study, it was discovered that about two million tons of kaolin occur in Osun State and more are still being discovered year in, year out. It was also discovered that Kaolin in Osun State can last for more than 50 years no matter the amount supplied per day. More investors are still needed to invest in the mining of Kaolin because the mineral is an exploitable mineral that can last for more than 50 years.

Columbite / Tantalite in Osun State

Alluvial deposit indications of Columbite have been discovered in Osun State. Columbite have been discovered to be of economic quantity in Osun State and proven reserves shows that the mineral can last more than 50 years. Though no exact figures have been recorded but mining is being done in Iperindo Nigeria Mining Corporation.

Columbite is used in special alloys required in air craft engines; heavy construction equipment. Tantalite in the course of this study, was discovered to be similar to Columbite and discoveries have proved it to be of economic quantity in Osun State, though no exact figures, have been recorded. Mining is being done in Ilesha to Ifewara town S. A. Akinpelu limited. Tantalite in Osun State has been proved last for more than 50 years.

Tantalum is used as electronic emitter iii electronic tubes; jet engine turbine bladder, rocket nozzle coating. These minerals occur in Atakunmosa West and Ife East local government. Also it was discovered that indication also occur in some towns in the State too.

Clays. (Laterite) in Osun State

This mineral have been discovered to occur in the following local government; Atakunmosa East, Atakunmosa West; Ede, Ifelodun; Ife north. Clay in Osun State has been proven to be of economic quantity though no exact figures of deposit have been recorded. Clay is used in paint; rubber; plastic; ceramics; refractory bricks industry and in construction works.

CONCLUSION

In this study, it was discovered that Osun State has a lot of minerals in which almost all are of economic quantity that can last for over 50 years without depending in value and can generate high income to the economy of the state.

It was also noted that Osun State still needed a lot of investors to invest in the mining of these minerals. The government can even embark on the mining of these minerals so as to generate more capital for the government. With everything that has been discovered and analyze concerning the minerals in the state, the government still has a lot of role to play in seeing that these resources are fully utilized.

Investment in solid minerals resources development has it advantages including creation of employment opportunities, increase and diversification of the economic resource base, income generation, increased self-reliance and decrease independence on overseas suppliers.

RECOMMENDATIONS

In the course of this study, a lot of things has been discovered that is hindering the effectiveness and efficiency of mineral prospecting potentials of Osun State from been utilized and the following recommendations are hereby submitted for the consideration of the government of Osun State so as to see to the development of mineral potentials and mineral prospecting in Osun State.

1. The state government should commission the preparation of a detailed Mineral Resources Map of Osun State covering all the local government areas at a scale of 1:1 0000 or better.
2. For each identified mineral or mineral aggregates with economic potential, the state government should investigate the market supply and demand and assist private investors and foreign investors in setting up appropriate — scale mineral based industries.
3. The state government may wish to open tip and establish industrial parks and estates in mineral rich areas.
4. The state government should encourage state-owned institutions such as polytechnics and technical colleges to engage in mineral investigations, including development of technological processes for extracting minerals.
5. The state government should apply for lease for prospective areas not already allocated.
6. The state government should set aside a percentage of its income to promote mineral development activities.
7. Upgrade or establish an appropriate unit in the Ministry of Commerce and Industry to participate meaning fully in minerals investigation and development.
8. Work out modalities for the establishment, with private sector participation of a State Mineral Development Company, to set the pace for minerals investigation and development.

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