MINISTRY OF MINES AND STEEL DEVELOPMENT

Gold deposits

Exploration opportunities in Nigeria

Nigeria
Good People Great Nation

MMSD

Gold Deposits

Exploration opportunities in Nigeria

INTRODUCTION TO NIGERIA

Nigeria lies approximately between latitudes 4°N and 14°N, and between longitudes 3°E and 15°E. Nigeria has an estimated current population of about 140 million, making it the most populous country in Africa and the tenth most populous in the world. The country's economy has witnessed increasing growth in recent years with the Gross Domestic Product increased by 6.1% from 2006-2008.

Nigeria has a long, but discontinuous history of mining and the country was a prominent exporter of tin, columbite and coal. Mining is administered through the Ministry of Mines and Steel Development, which is promoting private-sector led development and has initiated deep and wide ranging reforms of the mining sector.

These include:

1. A new mineral policy that will encourage greater private sector participation in an environment of orderly and sustainable development for the exploitation of solid mineral resources .

The focus of this new policy is to take full advantage of the increased international commodity prices and the global resurgences of exploration activities and:

- Achieve a substantial increase in GDP contribution by the minerals sector;
- Generate quality geoscience data;
- Formalise Artisanal and Small Scale Mining (ASM) operators;
- Achieve poverty reduction through ASM operations;
- Generate employment opportunities;
- Create wealth through value addition;
- Increase capacity of mineral based industries;
- Attract private investment capital;
- Facilitate capacity building opportunities in the solid mineral sector.

2. Signing into law of a new Minerals and Mining Act 2007 to ensure security of tenure, competitive fiscal terms and the encouragement of an industry led by private investors

3. Establishment of the Mining Cadastre Office (MCO) to administer mining titles “with integrity and in a transparent manner on a 'first-come first-served' basis”.

CONDUCIVE ENVIRONMENT

Certain basic facilities favourable for conducting business exist in the country.
These include

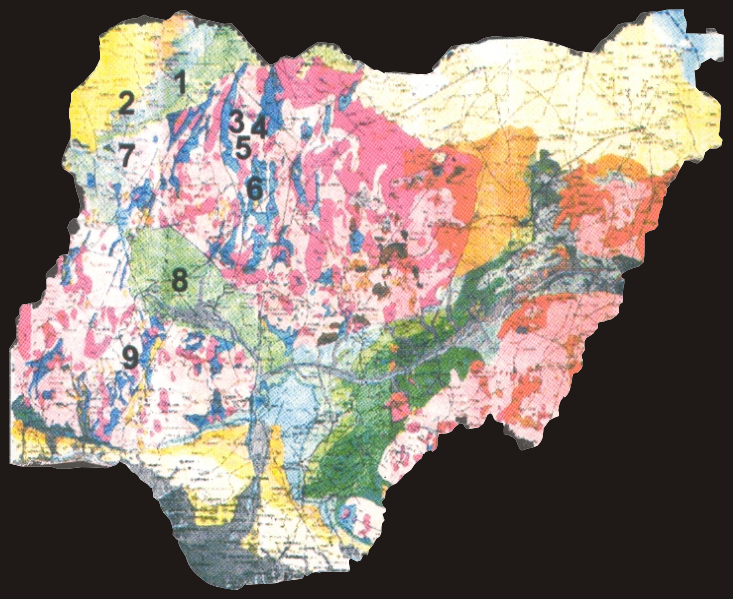
- A fairly developed infrastructure such as road network, deep ocean ports and jetties.
- Improved communication system
- Supportive banking institutions
- Relaxed foreign exchange for capital raising
- Existing joint venture opportunities
- A large community of skilled geoscientists and engineers
- A commitment to privatization

EXPLORATION OPPORTUNITIES IN THE NIGERIAN GOLD DEPOSITS

HISTORY OF GOLD PRODUCTION IN NIGERIA

In the absence of any systematic exploration and development, the Nigerian goldfields have experienced intense artisanal workings which target both the primary gold-quartz reefs and their associated alluvial occurrences.
Officially recorded gold production in Nigeria started by 1913 and peaked in the period 1933-1943 when about 1.4t of

GEOLOGICAL MAP OF NIGERIA SHOWING THE MAJOR AREAS OF GOLD MINERALIZATION



EXPLANATIONS

- Meta-Sediments
- Granitoids
- Sandstones
- Clays and Grits
- Sands and Clay
- Gneiss Migmatite complex

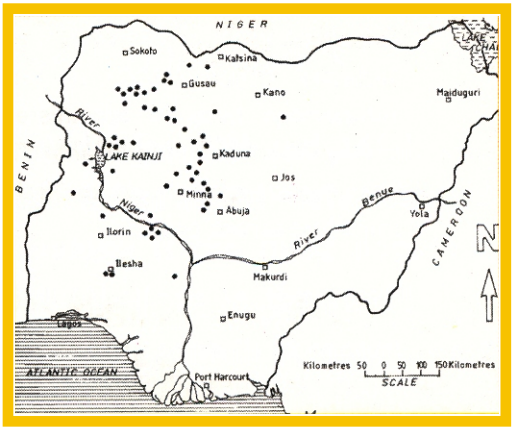
1. Maru
2. Anka
3. Malele
4. Tsohon Birnin Gwari
5. Kwaga
6. Gurmana
7. Bin Yauri
8. Okolom-Dogungaji
9. Iperindo

gold were produced. The gold production declined during the Second World War period and never recovered as mines were abandoned by mostly colonial companies.

The Nigerian Mining Corporation started exploration for gold in Nigeria in the early 1980s but failed to be sustained due to lack of funds. The discovery of petroleum and its subsequent domination of the Nigerian economy also contributed to the lack of attention to gold exploration despite the widespread potentials.

OCCURRENCE

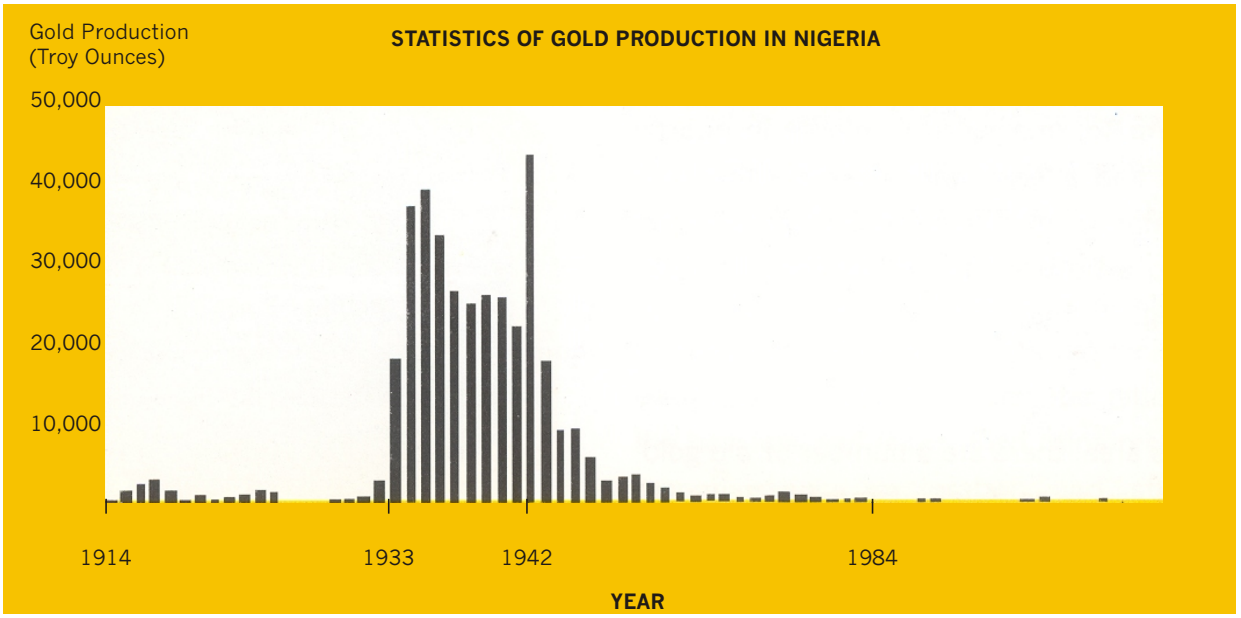
Gold in Nigeria is found in alluvial and eluvial placers and primary veins from several parts of supracrustal (schist) belts in the northwest and southwest of Nigeria. The most important occurrences are found in the Maru, Anka, Malele, Tsohon Birnin Gwari-Kwaga, Gurmana, Bin Yauri, Okolom- Dogondaji and Iperindo areas, all associated with the schist belts of northwest and southwest Nigeria. There are also a number of smaller occurrences beyond these major areas.



The areas of gold occurrences in Nigeria.

GEOLOGICAL SETTING AND MINERALIZATION

Nigeria Archean to Lower Paleozoic basement rocks consist of a migmatite-gneiss-quartzite complex. They bear imprints of Liberian, Eburnean and Pan-African tectonic events. The enclosed schist belts lithologies consist of upper Proterozoic fine grained clastics, pelitic schists, phyllites, banded iron formations, marble and amphibolites with imprints of the Kibaran and Pan-African tectonic events.



Metamorphism within the belt is that of green schist facies grading into amphibolites, especially in the older gneiss migmatite-quartzite complex, with lesser volumes of volcanic rocks.

Primary gold mineralization in the schist belt commonly occurs in quartz veins within several lithologies. Morphologic types include bedding concordant veins or discordant vein system. Mineralized wall rocks are common adjacent to known veins and may be impregnated with fine grained sulphide minerals.

ZAMFARA STATE

- **Maru**

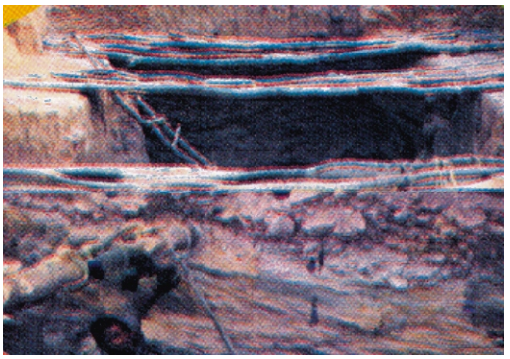
Two old gold mines are most important, and are within the Maru schist belt. Duki Mine is hosted by a shear zone traversing a quartzite-schist series, often exploiting the S_1 schistosity planes. The mineralization apparently made up of gold-quartz veins, was exploited by past miners for over 1 km of strike length, leaving behind series of collapsed N-S trending workings without any surface exposures of the mineralization. Recent explorations drilling by the Nigerian Mining Corporation have shown the continuity of the gold-quartz-sulphide veins below the old workings.
The other old gold mine (Maraba) is a two sub-parallel quartz vein (~ 300 m long) system. Tourmaline and chlorite in quartz floats and altered wall rocks are the only indicators of mineralization, as there are no in situ exposures due to intensity of past mining.

- **Anka**

In this area, there are a number of old gold mines, such as Kwali, Jameson, Zuzzurfa and Kuba, hosted by schists, phyllites and quartzites of the schist belt. Individual veins or reefs seldom exceed 0.5 km of strike length as indicated by the extent of past workings, and are concordant with the host rock foliation. These mineralized wallrocks show metal values in the following range: Cu = 647-5410 ppm, Pb = 7550-22600 ppm. Ag = 1.5-8.6 ppm, and Au = 123-6320 ppb.

- **Malele**

The Malele area is in the extreme southern part of the Maru schist belt. Gold Mineralization occur in a NNE trending goldquartz vein series cutting both biotitegneiss and chlorite schist, now represented by a series of sub-parallel surface workings (pits, trenches and water ponds) with the vein exposures seldom observed. The mineralization was discovered in 1934 with the most prominent of the veins being 1.5 m thick by 370 m long and a grade of about 30 ppm Au.



KADUNA

• Tsohon Birnin Gwari and Kwaga

The Tsohon Birnin Gwari and Kwaga gold sites are within the Kushaka schist belt of northwestern Nigeria. While the Tsohon Birnin Gwari was an active gold mine in the 1930s where over 600 ounces of gold were produced, the Kwaga site is a recent discovery by artisanal miners following the extensions of the Tsohon Birnin Gwari mine.

The Tsohon Birnin Gwari gold reef system is about 7 km long, while the Kwaga reef system extends for about 3 km. Gold is mainly associated with pyrite and minor sphalerite, chalcopyrite, pyrrhotite, galena and magnetite. The gangue is predominantly quartz, but K-feldspar and graphitic matter (from wall rocks) are also constituents. Grades are very variable within the reef system and between oxide and sulphide ore zones, but generally 5-100 g/t Au are found.

Recent core drilling and near-surface mine exposures have provided relatively fresh samples of the gold-quartz reefs and their altered wall rocks from which the geochemical characteristics of the Tsohon Birnin Gwari mineralization were studied.

KEBBI STATE

• Bin Yauri

Gold-sulphide-carbonate quartz veins occur in a brittle fault zone cutting hornfels of the contact of a Pan-African granodiorite batholith intruding phyllites and tourmalinites of Zuru schist belt in northwestern Nigeria. Mineralization has been uncovered over a strike length of 1.5 km by past miners (1920s-1940s).

Gold occurs associated with pyrite, chalcopyrite, galena, and minor sphalerite, magnetite and bismuth telluride in a gangue of mainly quartz with some carbonates, sericite, chlorite and tourmaline. The gold veins are surrounded by a narrow zone of hydrothermal alteration in which a chloritetourmaline- pyrite-carbonates association overprints a dominantly sericitic fabric of the hornfels wall rocks. Past mine records, reconnaissance exploration and studies have shown gold grades in the range 5-15 ppm.

NIGER STATE

• Gurmana

The Gurmana area of gold mineralization is situated in the extreme southern part of the Kushaka schist belt. Gold mineralization is in the form of quartz-sulphide veins and stockworks hosted by amphibolites and gneisses. The gold-quartz-sulphide veins seldom extend more than a few tens of meters. Gold occurs with pyrite, chalcopyrite, galena, covelite and chalcosite.

KOGI STATE

•Okolom-Dogondaji

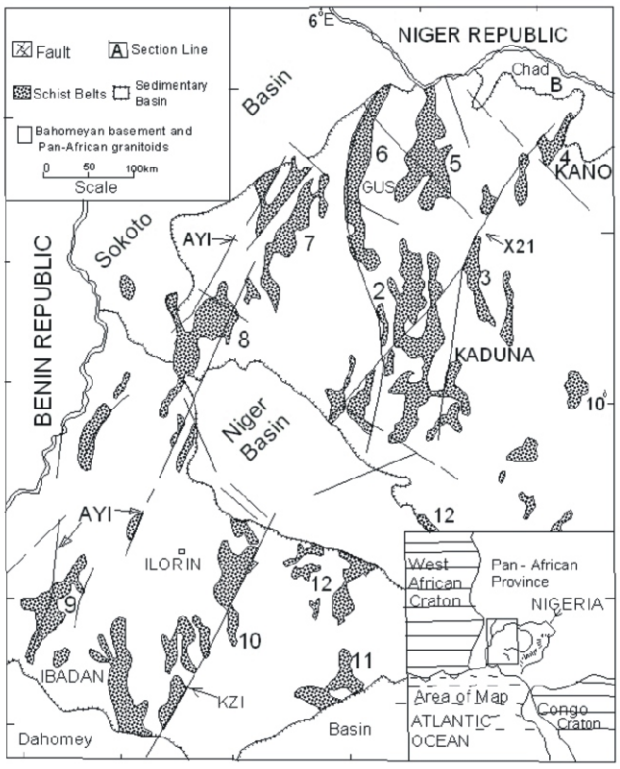
The Okolom-Dogondaji area of gold mineralization is in the Egbe-Isanlu schist belt of southwestern Nigeria, and the primary gold-quartz veins and eluvial/alluvial placers have been mined extensively in the period 1930s-1950s. A series of gold-quartz veins is hosted by N-S and NNE-trending shear zones, which cut gneisses, schists and amphibolites.

The most prominent site is the Okolom old mine, which a gold-sulphide-quartz reef system with a total strike length of about 3 km hosted by gneiss, amphibolite and talc schist. Other sites in the (Dogondaji) area have relatively smaller veins hosted by amphibolites, gneisses, mica schists and phyllites. Gold is associated with pyrite, marcasite, pyrrhotite, chalcopyrite, argentite and galena, with a gangue of quartz, tourmaline, sericite and chlorite.

NEW DEVELOPMENTS AND EXPLORATION INFORMATION ON GOLD MINERALIZATION IN NIGERIA

Recent investigation by the Nigerian Geological Survey Agency and private exploration/mining companies has continued to shed more light on the endowments and the potentials of the country in gold mineralization. Between the years 2006 and 2008 the Nigerian Geological Survey Agency (NGSA) has carried out evaluation and assessment of key commodities nationwide. Gold is one of the commodities given priority. Beyond the known areas of gold mineralization and some six other states with favourable geological setting for gold mineralisation, two other states (Ogun and Ondo) were investigated with Ogun state showing prospect for the resource.

Gold mineralization in Nigeria appears to be the orogenic type which is controlled by deep seated curvilinear transcrustal fracture system. These deep seated fracture systems, Anka-Yauri-Iseyin (AYI) and Kalangai-Zuru-Ifewara (KZI) are believed to serve as conduits to the subsidiary fractures which are linked to these major fractures and form sites of gold deposition. A summary of other known gold occurrences in Nigeria is also given to serve as guide to investors

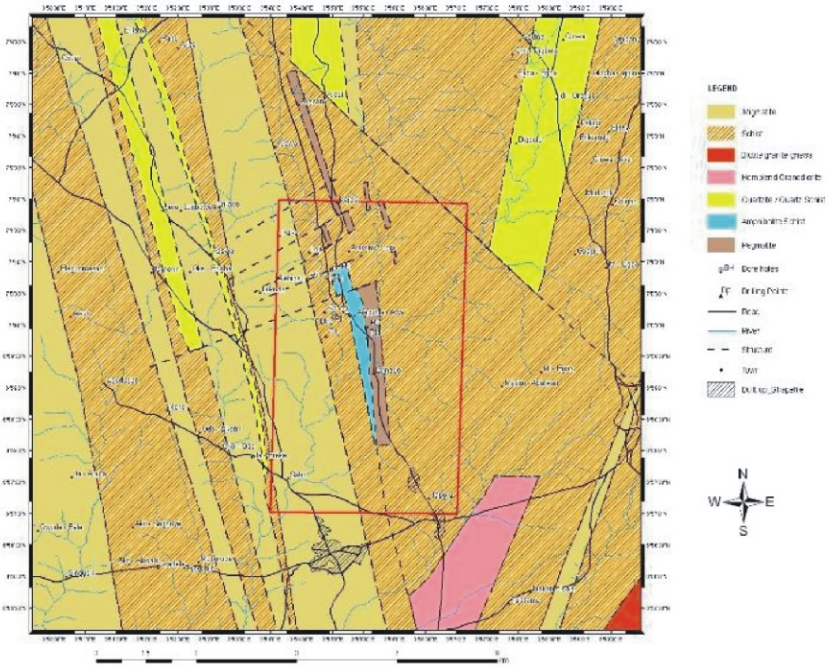


A generalised geological map of western part of Nigeria showing transcrustal fracture system. AYI (Anka-Yauri-Iseyin) and KZI (Kalangai-Zuru-Ifewara)

OGUN STATE

Exploration for gold in Ajegunle-Awa area of OgunState shows minor gold occurrence in the residual soils at the contact between amphibolites and pegmatites. These rocks are highly fractured and brecciated with vugs and occasional pyrites noticeable in the drill core samples. Analytical results of panned concentrates of soil samples from the C-horizon gave an average of 26ppm Au content. These finding suggests the possibility of gold mineralization in the southern most portion of the curvilinear transcrustal fractures which are believed to be linked with gold mineralization in Nigeria.

Geological map of part sheet 261 Ibadan and sheet 280 Ijebu -Ode



Angular Gold grain in panned soil concentrate from Ajegunle

OSUN -Iperindo

The Iperindo gold mineralization is in the Ilesha schist belt of southwestern Nigeria which comprises a series of gold bearing (Au-quartz carbonate) veins localized by subsidiary faults hosted within biotite gneiss and mica schist. These are hitherto defined by sub parallel old working extending for about 900m in NE direction. Gold occurs with pyrite, pyrhotite and minor chalcopyrite, galena, sphalerite, magnetite and ilmenite. Wall rock alteration associated with the gold mineralization shows sericite-chlorite-epidote assemblage± heamatite and pyrite. Recently (December 2009), Segilola Gold Ltd. A wholly-owned subsidiary of CGA Mining Ltd(listed on Toronto Stock Exchange and Australian Securities Exchange) announced the maiden resources og 620,000 ounces of gold on its Iperindo project. Segilola Gold Ltd generated the resources from first pass diamond drilling campaign of 12,166mteres in 119holes ranging from 40-220 metres. Major findings show the tenor of gold in their mining lease at between <1g/t 136 g/t gold . Also in the course of the exercise the strike length of the mineralized zone has been increased to 1500m.

Geological studies by the company confirms the widely held view that the regional geological setting of the area is similar to the Ashanti and Salwi gold systems in Ghana.

KWARA STATE

Kwara state is underlain by rocks of the Basement complex represented by granites, granodiorites, gneisses, pegmatites, phyllites and schists. Gold mineralization is found associated with gneisses and schists at Bishewa, Ologomo, Agboro, Korobiri and Degeji area. Sandtone beds at the contact between the Cretaceous sediments of Nupe Basin and the Basement Complex around Bishewa and Gidan Sani are also known to host gold. Evaluation of this resource in panned concentrate of soils and stream sediments around Bishewa, Gidan Sani, Koro and River Wara gave between 4.1g/t - 8.3g/t, however assay of most of the gneisses found proximal to these areas range between 1.1g/t-4.5g/t. New locations found are Ndanaku, Mari, Oputa , Lokomosi, Tunga Bichi, Gbajubo, Giloadi and Birnin Ruwa. Preliminary evaluation and assessment of the resource in Ndanaku and Birnin Ruwa gave gold values averaging 5g/t. This suggests that the area of gold mineralization is extensive.

CROSS RIVER STATE

The Oban Massif has the unique feature of being detached from the rest of the Nigerian Basement Complex area by the Mamfe sedimentary embayment. It is also the only part of southeastern Nigeria where gold mineralization is known to occur

Exploration for gold in Oban Massif area of Cross River State indicates the area to be underlain by Cambrian to Precambrian rocks consisting of phyllitic schist, amphibolite, pegmatites, granites and charnockites. There is evidence of intense deformation of the schist and deep weathering. Satellite imagery interpretation of the area shows deep sutures cutting across each other at almost right angles.

Evaluation and assessment of the area show gold anomalies in stream sediments from Akor River and residual soils in the adjacent upland areas. Assay of panned concentrates obtained from stream sediments gave >2gm/t gold. At Kwa Riiver upstream of a major waterfall and approximately 2km southwest of Oban assay value of 0.7gm/t gold was obtained. Also panned concentrates soil samples evaluated in some of these areas gave >100ppm gold.

KEBBI STATE

New data on gold mineralization was recorded from several areas in this state, the locations that appear to show the best prospects are as follows; Mararaba-Waya-Rafin Bakin Dutsi, Laka and Gerin Hawal. The area underlain dominantly by quartz schist, mica schist and phyllites with xenoliths of amphibolites.

At Mararaba, primary mineralization consists of vein type with rusty brown coloured and milky quartz in association with sulphides. Veins were found to vary between 5.2cm and 0.48m in width. Assay values range from 0.22 and 6.5gm per ton. The veins exhibit pinch and swell structure and higher tenor is often associated with the swells.

At Waya, the area is underlain by muscovite schist and phyllites with occasional chlorite schist. Most of the gold mineralization is in quartz and quartzofeldspathic veins. Gold occur as free gold and as inclusions in sulphides form (the sulphides are usually pyrites and chalcopyrites). Assay values are between 3 and 4gm per ton.

At Rafin Bakin Dutsi, the area is underlain by phyllites and quartz schist intruded by granodiorite.Gold mineralization is found in the limonitized quartz in the hornfelses between the schist and the granodiorite. Assay values of vein yield figures of between 0.3 and 3.9gm per ton.

At Laka, the area is underlain by schists and phyllites which are intruded by quartz veins. The veins are intensely brecciated and limonitized. Two of such brecciated zones were exposed during this study.
The existence of quartz rubble (often auriferous on the surface) is a clear sign of the existence of such breccias at subsurface. Assay values of veins yielded between 2.19 and 6.68gm per ton At Makirin, the area is underlain by schists, phyllites, migmatites and gneisses all concordant with a NE-SW foliation trend. Gold assays for veins vary between 0.19 and 2.59 gm per ton.

At Gerin Hawal, the area is underlain by brownish pelitic schist, quartz schist, quartzites and occasional migmatite. Gold bearing veins are NNE-SSW trending and are limonitized quartz with vugs some of which are lined with gold grains. The highest assay value obtained in the vein is 34.48gm per ton.

There are extensive alluvial and elluvial workings in the area some reaching depth of up to 21 meters. Studies undertaken so far indicate that this state is likely to be richer in gold mineralization than any other in the North West, the area that at present holds out the best exploration prospect.

KOGI STATE

The State is underlain by pelitic and talc schists, granodiorites and pegmatites. In addition to the already explored occurrences in Okolom, Dogondaji and Egbe-Isanlu areas, new finds are at Assay value of up to 12gm per ton was obtained from a vein in Dogondaji. The mineralized area of this state is contiguous with that in the neighbouring Kwara State.

OYO STATE

The northern part of the state is underlain by extensive low grade chlorite and mica schist amphibolites, gneisses which are intruded by granodiorites. At Shaki and Irawo areas, the schists are intruded by Syenites. Gold anomalies were obtained from panned overbank sediments. Values of 5 to 7 gm per ton were recorded from first and second order streams.

At Ilasa area, at a dry stream bed near the settlement of Daba Samia, gold recovered from one head pan (weighing 27 kg) weighed 15gm. at the time the site was discovered. The gold is hosted in a brecciated zone cutting the saddle of a tightly folded amphibolite zone trending roughly North -South. The site represents the known westernmost point of gold mineralization in Nigeria.

Gold bearing quartz vein in hornfels at Mararaba Bin Yauri, Kebbi State, Nigeria

EMERGING INVESTMENT OPPORTUNITIES

Investment opportunities abound in the following areas

1. Applying for mineral titles with a view of wholly owning the mining rights for the gold deposit
2. Partnering with existing title holders for detailed exploration as consultants and specialists
3. Partnering with existing title holders in joint venture agreement to explore, mine and market the gold resources of areas of interest
4. Legal transaction in gold won in quarries and operations for export

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MMSD 2010