

ETHIOPIA

1. Current Status of the Mineral Sub-sector

Even though modern mining in Ethiopia is recent, gold has traditionally been mined from alluvial and, to a lesser extent, primary free gold since ancient times. However, modern gold mining began only in 1930s with the discovery of placer gold in Bedakesa Valley of Adola area, southern Ethiopia. Later on, modern investigation continued and resulted in the discovery of important deposits of gold, such as Legedembi, and other minerals

Other mining activities include the production of tantalite (20 tons per year) and soda ash (20,000 tons per year), on pilot scale. Mining of kaolin, dimension stones (limestone, marble and granite) and small scale and artisanal mining of precious metals, gemstone, salt, industrial minerals and construction materials are the main mining activities in Ethiopia

In general, current activities in the mineral sector are being dominated by the private sector. Some of the privately owned mining activities include; the Dalleti marble which was purchased by the National Mining Corporation (NMC) from the previous Ethio-Libyan Joint Mining Company, and Legedembi primary gold mine which is also purchased by NMC. Gold exploration activities, which were initially designed and implemented in order to increase the production of gold, have also been given in concession to private companies

As a result of the conducive fiscal and legislative environment, the country is now enjoying the participation of both foreign and local investors in exploration and mining. So far, about 9,400 square kilometres of potential area for gold and other minerals are under concession. In addition to 19 local companies, 11 foreign companies have been granted prospecting, exploration and mining licenses for gold and base metals, platinum, industrial and construction minerals, notably, potash, diatomite and high quality ceramics raw materials. The companies came from South Africa, Canada, America, Guyana, Italy and Norway. Moreover, relatively new concepts and models for the local industry are

being tested for exploration of epithermal systems (outside the well known gold fields of the greenstone belts) in the Rift Valley volcanics. Intensive exploration programs are also being conducted for precious stones such as diamonds and sapphire and other gemstones in different parts of the country. Names of companies who are currently operating in the country and their license detail are attached herewith.

For the collection and dissemination of geological information, ten capital projects are being carried out by the Ethiopian Geological Survey in different parts of the country in the current fiscal year. The projects include two regional mapping, one hydrogeological study, two industrial minerals exploration (one for phosphate), two gold and base metals exploration, one geothermal exploration, and one for equipping the geological laboratory with modern equipment to upgrade the facility. The ongoing exploration activities which are being carried out by the Geological Survey will add information on mineral occurrences. Such information will be provided to potential investors.

1. Potential Areas of Investment

The country's mineral resource is untapped despite its enormous potential. This is exhibited by the very low contribution of the sector to the national economy. The government's intention in the future lies in the collection of basic geological information and delineation of the possible mineral occurrences for potential investors.

Potential investment areas in the mineral sector are concentrated in the Adola, Ageremaryam, Moyale, Western Akobo and Tigray greenstone regions. The details of each greenstone region is discussed briefly below.

2.1. Adola Greenstone Region

The Adola belt is 20-25 kilometres wide and some 150 kilometres long. Adola area is covered by geological mapping and is underlain by units of the Precambrian basement complexes. Only the middle and upper complexes have been studied in any detail. These have been deformed in linear north-trending folds, which have been cut by deep-seated longitudinal faults, and flexures trending northeast and northwest. The Upper Complex,

the Adola volcano-sedimentary sequences, is confined to the 20-25 kilometre-wide Megado graben-syncline. The syncline is a down faulted and folded block bordered by the higher metamorphic grade Middle Complex units.

A helicopter-borne geophysical survey was done on the area and magnetometer, electromagnetic and radiometric data were collected along the flight lines. The result is available in hard copy and on CD-ROM. The majority of the known gold-bearing areas are in this region. The Kenticha Greenstone Belt, lying 12 to 15 kilometres east of the eastern marginal thrust of the Adola Belt, contain some gold, but is chiefly of interest for nickeliferous laterites and rare metals, associated with ultramafics and pegmatites, respectively.

Most of the mining activities in the country is concentrated in this area. Currently, National Mining Corporation is carrying out exploration for gold and associated minerals in this locality and has also purchased the Legedembi gold plant and the surrounding deposit of 88 square kilometre area. Placer gold exploitation is taking place by a state-owned enterprise in the area. This enterprise is also in the process of being privatised. In this same area, ceramic mineral is currently being mined to be used as raw material for Tabor Ceramics Factory built in Awassa town.

The area is highly promising for gold, rare metals, feldspar, quartz, nickel, chromium and kaolin.

2.2. Ageremaryam And Arero Greenstone Region

The Ageremaryam area is some 260 kilometres southwest of the town of Kibremengist in Borena Zone Oromia National Regional State. The heavy concentrate geochemical surveys conducted in this area have located gold anomalism along a north-south zone some 48 kilometres long and 4 kilometres wide. In the Ogo Basin, the coarser gold grains are probably been derived from quartz veins, whereas the finer gold is from pyrite which is found as dissemination and stringers, predominantly in graphitic quartz-mica schists. Overall, the low-metamorphic grade schists are the host for the gold in this basin.

During the regional lithogeochemical survey, tantalum dispersion trains were located over the gneisses of the Buluka and Bore formations. The anomalism has associated Nb, Li, Sn, Pb and Mo. These, coupled with the high tantalum contrast between background and anomalous contents, suggest that they are related to rare earth mineralisation, and hypothetically linked paragenetically to albitite apogranites formed by metasomatism.

The Arero Greenstone Region is some 100 kilometres south-west of the town of Kibremengist. It is the southern extension of the Adola Greenstone Belt. Regional and follow-up heavy concentrate surveys, regional and follow-up lithogeochemical surveys, and detailed prospecting and exploration surveys were conducted in selected parts of the area.

The regional heavy concentrate work demonstrated that high gold contents were associated with high contents of pyrite. The auriferous pyrite occurs in meta-basic and meta-ultramafic lithologies. Bismuth, tin and tungsten anomalies are confined to a northwest trending zone which crosses the regional structure and lithologic trend. It was suggested that this granitophyllic type mineralisation is controlled by a north west structure.

Three types of mineralisation were suggested in the area:

- Gold related to pyrite bearing meta-basic and meta-ultrabasic rocks which are confined to two zones within a northwest trending zone;
- Cr, Co, Ni, V related meta-ultramafic rocks occurring along deep seated faults or perhaps along a northeast trending thrust zone; and
- Bi, Sn, W related to intermediate-to-acid alkaline intrusions occurring as dikes and veins within meta-basic to meta-ultramafic rock units. These are confined to a northwest trending metallogenic zone discordant to the general regional geologic trend.

The lithogeochemical surveys resulted in dividing the Arero area broadly into east and west geochemical blocks, separated by a thrust or deep seated fault zone. The east block is characterised by acidic intrusions, and the west block by meta basic and meta-ultramafic intruded by basic and acidic dikes, pegmatites and quartz veins.

2.3. Moyale Greenstone Region

The Moyale Greenstone region is in southern Ethiopia, on the border with Kenya. Owing to its location almost south of the Adola Greenstone Belt and to similar lithologies, it is considered to be a southern extension of the Adola Greenstone Belt.

Moyale Greenstone Region is about 2 kilometres north-northeast of Moyale town. The geology of the area is relatively simple. A meta-granodiorite batholithic body underlies the area. It is in tectonic contact with basic to ultramafic rocks on the east and on the west. There are many quartz veins in the area. They have three general orientations: striking north south (following the general foliation), northeastern and northwest.

The mineralisation in the area is of two types: gold-sulphide in quartz and gold-quartz without or with minor sulphide. The gold-sulphide veins are characterised by appreciable lead, copper, zinc, and pyrite.

The Hassamte-Haramsem area is located east of the town of Moyale. The rocks in this area are meta-granodiorite, amphibolite, amphibolitic gabbro, garnetiferous gabbro, banded amphibolite and chlorite amphibolite schist. Primary gold is found in both amphibolite and granodiorite. There are different generations of quartz veins with visible and invisible gold. The most prominent are quartz veins filling extensive gash fractures of the shear zone in the granodiorite. The intensely sheared part of the amphibolite contains fine, disseminated pyrite and chalcopyrite mineralisation. The intensity of mineralisation is related to the intensity of alteration and shear-zone fracturing.

2.4. Western Greenstone Region

The predominant lithologies of the western Greenstone belt are chlorite, sericite and graphitic schists, phyllites, quartzites, and andesitic to rhyolitic volcanics. Iron-bearing quartzites and intraformational conglomerates are also present. The metamorphic grade is no higher than upper green schist to lower amphibolite facies, but commonly does not exceed lower green schist facies. The area is underlain by a plutonic basement of meta-diorite-granodiorite, unconformably overlain by the meta-volcanic – meta-sedimentary sequence of the late Proterozoic Tsalet group.

Under the Western Greenstone Region the following potential areas are identified:

2.4.1 Gold and base metal deposits.

- Azale-Akendayu, located 22 kilometres south-east of the town of Kurmuk,
- Ashashire,
- Boka-Dalleti-Bindakoro,
- Oda-Godere,
- Mount Dul,
- Ondonok, located some 55 kilometres northeast of the town of Assosa,
- Tulu Kami, located 4.5 kilometres east of Nejo,
- Metti,
- Lega Baguda, located 48 kilometres southeast of Yubdo,
- Chokorsa, located 20 kilometres southeast of Nejo,
- Tulu Kapi and Ankori, located some 15 kilometres northeast of Yubdo,
- Keta, located 7 kilometres east of Nejo,
- Bomu Menghi,
- Bascia, located 25 kilometres southeast of Assosa,
- Gambella Mountain, located near the border with the Sudan,
- Guba, Dura Abelli drainage, Beles drainage, Abumari, Abteselo, Mekezen.

2.4.2. Platinum Deposits

- Yubdo:- the deposit was discovered in 1923 - 1924 and mining was started in 1926. Through 1976, approximately 2000 kilograms of platinum concentrate were produced. From nearby drainages, nuggets several millimetres across have been analysed. They are a Pt-Fe alloy, with platinum far more abundant than iron.
- Dalatti and Tulu Dimtu.

2.4.3. Iron and phosphate deposits

- Bikilal, located 18 to 20 kilometres northwest of the town of Gimbi. The area studied is underlain by three principal rock groups: Amphibolite and amphibolite schists, Bikilal intrusive basic rock and Granite group rocks. The phosphate potential is in an apatite-bearing anorthosite gabbro formation. Spatially and genetically it is associated with an intrusion of gabbroic rocks.

2.5. Akobo Greenstone Region

The lithologic units of the Akobo Greenstone Belt are generally similar to those in the Western Greenstone Belt and are considered a southern extension of that terrain. The rocks here include relatively low grade meta-sedimentary and meta-volcanic units which enclose ultramafic lenses. The five general lithologic types in the Akobo basin disregarding the plutons, are:

- mafic schist and gneiss,
- meta-ultramafic bodies,
- meta-sedimentary schists,
- marble , and
- undifferentiated schist and gneiss.

The Akobo basin merits prospecting for platinum as well as for gold and other metals such as copper and nickel.

2.6. Tigray Greenstone Region

The Tigray Greenstone Region is located in northern Ethiopia. The late Proterozoic Tsaliet group is well developed in this region and consists of propylitized andesites and diabases, tuffaceous slates and graywackes. This predominantly volcanic sequence merges into the overlying Tambien group. The main rock types in this group are slate and shale-commonly graphitic-with interbedded limestones. Small bodies of pyroxenite and serpentine are found in western Tigray. Metamorphism has reached the green schist facies as a rule, although locally it has reached the amphibolite facies.

Mineralisation in the known deposits is predominantly pyritic, with associated copper, zinc and lead sulphides. Base-metal occurrences and geochemical indications are found in a number of areas in the Tigray region. Copper occurrences and geochemical anomalies are found associated with the Tsaliet meta-volcanics in the lower Werri and Tsaliet river drainage as well as west-central Tigray. Lead and Zinc anomalies in soils are present at Mariam Adi Destra, southeast of Hauzien, trending across the Giva river.

The mineralisation of copper prospect at Tsehafi Emba occurs within a meta-gabbro associated with other metamorphosed intrusion, all forming a syntectonic complex. This complex, known as the Firfira, lies within the low grade, regionally metamorphosed volcanics and sediments of the late Proterozoic Tsaliet group.

2.7. Ethiopian Rift Zone

The Ethiopian rift zone forms a valley that cuts through Ethiopia in a general north-north-east direction. It is a graben, the failed arm of the Red Sea Gulf of Aden triple junction, which was formed during the opening of what are today the Red Sea and the Gulf of Aden. As the Rift Valley approaches Djibouti, the western boundary faults turn to a more northerly direction, forming the Afar and Danakil Basins.

The Danakil depression is some 120 meters below sea level and is east of the normal fault zone that borders the Precambrian schists of the Tigray Greenstone Region. Major potash deposits exist near mount Dallol within the Danakil depression. There are surface

deposits of salt and sulphur, shallow manganese deposits, and subsurface evaporite deposits of potash salt.

The soda ash resource is located approximately 200 kilometres south of Addis Ababa. The waters of Lake Abijata, Shala and Chitu have medium to high salinity and contain sodium-chloride-carbonate. Soda ash is being produced from lake Abijata on a semi-commercial scale.

3. Mining Legislation

As a result of the political change that took place in 1991, a new economic policy has been introduced in the country. In the mining sector, the government has promulgated a new Mining Proclamation and Mining Income Tax Proclamation to encourage the participation of private capital in mineral prospecting, exploration and development activities.

The new Mining and Mining Income Tax Proclamations were issued in June 1993. The Mining Regulations came into effect in April 1994. The Mining Proclamation No. 52/1993 and the Mining Income Tax Proclamation No. 53/1993 were amended in favour of investors in 1996. The following are highlights of the laws.

3.1. Mining Proclamation No. 52/1993 and Mining (Amendment) Proclamation No. 22/1996

These laws lay the general framework of rules governing the mining industry in Ethiopia and:

- Invite private investment in all kinds of mineral operation;
- Provide one year exclusive prospecting license;
- Provide three year exclusive exploration license with two renewal of one year each;
- Provide exclusive mining license for twenty years with unlimited renewals;
- Require adequate health, safety and environmental protection;
- Provide for inclusion of minerals which were not originally specified in the license as they are discovered;

- Guarantee the licensee's right to sell the minerals locally or abroad;
- Provide for exemptions from custom duties and taxes on equipment, machinery, vehicles and spare parts necessary for mineral operations;
- Guarantee the opening and operation of a foreign currency account in a bank in Ethiopia; retention of a portion of foreign currency earning; and remittances of profits, dividends, principal and interest on foreign loans etc. out of Ethiopia;
- Provide for 2% government free equity in mining operations;
- Require environmental impact study; and
- Provide for dispute settlement through negotiation and international arbitration.

3.2. Mining Income Tax Proclamation 53/1993 and Mining Income Tax (Amendment) Proclamation No. 23/1996

The laws provide for:

- Generous deductions and calculations of expenditure;
- Ten year loss carry forward;
- Write-off of investment within four consecutive years;
- 35% tax on taxable income generated from mining operation;
- 10% dividend tax;
- 2% optional state free equity; and

Up to 5% royalty on an ad valorem basis.