Minerals Available in Tanzania

Tanzania is endowed with abundant and diverse occurrences of mineral deposits due to its favourable geological setting with lithostratigraphic and tectonic units that includes the Archaean Tanzania Craton, the Palaeoproterozoic Ubendian and Usagaran mobile belts, the Mesoproterozoic Karagwe- Ankolean, the Neoproterozoic Mozambique belt, the Phanerozoic sediments of the Karoo, Coastal basin and Cenozoic volcanic rocks.

These mineral deposits include metallic minerals such as gold, iron, silver, copper, platinum, nickel and tin; gemstones such as diamonds, tanzanite, ruby, garnet, emerald, spinel, tourmaline, alexandrite and sapphire; industrial minerals such as kaolin, phosphate, lime, gypsum, diatomite, bentonite, vermiculite, salt and beach sands; building materials such as stone aggregates and sand; and energy minerals such as coal and uranium.

**Geology of the country with all chrono-stratigraphical units is potential for all types of mineralization.**
Cenozoic Volcanics
    Miocene to modern alkalic extrusives and sub-alkalic extrusive and tholeiitic intrusive rocks related to tectonic activity. Restricted to North-Central Tanzania and north end of Lake Nyasa.

Cenozoic sedimentary rocks
    Marine and continental sedimentary rocks of coastal plains and inland basins.

Mesozoic-Cenozoic alkali intrusives
    Carbonatites, kimberlites and related rocks occurring in small bodies across Tanzania. Locally of extrusive origin.

Upper Mesozoic Sedimentary rocks
    Jurassic and Cretaceous shales, sandstones, carbonates and evaporites of coastal basins.

Karoo Supergroup
    Clastic sedimentary rocks, entirely of continental origin in the south and southwest; and locally marine in the north. Late Carboniferous to Jurassic.

Bukoban Supergroup

Karakwe-Ankolean Supergroup
    Weakly metamorphosed schists, phyllites, argillites and quartzites. Confined to extreme northwest Tanzania.

Usagaran and Ubendian Supergroups
    Highly metamorphosed gneisses mostly of felsic composition, granulites. Includes local marbles. Ubendian in southwest Tanzania and Usagaran in the eastern Tanzania.

Granite-Gneiss terrane
    Foliated and unfoliated granitic rocks associated with the Archean units. In part Protogranulite, in part remobilized Archean.

Kavirondian

Nyanzian Supergroup
    "Greenstone" sequence of mafic folianite, lesser felsic volcanics, banded iron formations, fine-grained clastic sediments. Weakly metamorphosed. Confined to Lake Victoria region.

Dodoman Supergroup
    Sedimentary and lesser igneous rocks, highly metamorphosed and migmatized. Confined to central Tanzania.
The Archaean Craton

The Tanzanian Craton has three main divisions

- Sedimentary Super-Group (the Kavirondian)
- Low grade Greenstone Terrain (the Nyanzian)
- High Grade Metamorphic Terrain (the Dodoman)

Geographical Position of the Archaean Craton is depicted by blue line in the map below
Greenstone

Greenstone contains World-class Gold Mines of Geita, Bulyanhulu, Buzwagi, Tulawaka, North Mara, Resolute as depicted in the map below
Other Gold Deposits in Archaean Greenstones

- Kilima fedha, Buhemba, Kyabakari, Seka
- Mgusu, Msasi, Isambara
- Nyarugusu, Rwamgaza, Matabe, Tulawaka, Kalikweti, Mwiruizi
- Nyakafuru, Katente, Kerezia, Ng’anzo, Ushirombo Forest, Misasi, Mwiruizi
- Ibaga, Mpambaa
- Sambaru, Londoni, Ikungi
- Iramba-Sekeke, Kirondatal, Muhitiri

Mineralization in the Archaean High Grade Zone

There are good gold deposits of commercial interest

- the Madengi Hills and Nholi Gold Deposits
- The Nyakavangala, Mafulungu-Simbanguru, Mazoka-Undewa, the Kitunda

However, their tonnages have not been established and hence require further geological investigation

- Lithium hosted in pegmatites (Hombolo)
- Aggregates and Dimension Stones (e.g. Black granite in Itiso)
- Chrysoprase in Itiso
Other Minerals in the Archaean

- Copper – Silver associated with Gold Deposits (e.g. Bulyanhulu, Buzwagi)
- Nickel Deposit in Dutwa
- Copper Deposit in Ibaga
- Platinum Group Metals in Mara Region
- Aggregates and Dimension Stones (e.g. good pink granites between Biaharamulo and Chato)

Paleoproterozoic Fold Belts of Tanzania (Ubendian and Usagaran)

Geographical Position of the Paleoproterozoic Fold Belts of Tanzania (Ubendian and Usagaran) are depicted by surrounded red colour line in the map below where the main mineralized zones of Paleoproterozoic are Mpanda and Chunya
Mineral Reserves of the Paleoproterozoic Belts of Tanzania

- Gemstones in skarn and hydrothermal origin (Emeralds in Sumbawanga)
- Gold in Mpanda shear zones (Mukwamba, Sikitiko-Kapapa, D-Reef, Ibindi and Kapanda)
- Lead – Copper Deposits in the Mukwamba shear zones
- Copper in Kapalamsenga
- Gold in Lupa Shear Zones (Luika, Saza, Ntumbi, Matundas, Sangambi)
- Gold - Copper in Ludewa (Nkomang’ombe and Amani)
- Manganese in Kabulwanywele (Kilima kya Nkole) and Manyoro
- Iron ore in mafic rocks (Liganga in the Livingstone Mts)
- Iron ore in Chert (Itewe)
- Dimension stones (marble and granites) and other Industrial minerals

Mesoproterozoic Karagwe-Ankolean Fold Belt in Tanzania

Mesoproterozoic rocks are Low grade Metasediments (argillites, phyllites, low-grade sericiteschists and quartzites.

Mesoproterozoic mineralization

- Intruded by granites causing alteration haloes containing tin and tungsten mineralisation (small amount of gold and tantalite) in veins (The Kyerwa Tin Field).
- Intruded by mafic/ultramafic rocks containing Nickel and PGM (Kabanga and Kapalagulu).

Geographical Position of the Mesoproterozoic Karagwe-Ankolean are depicted by surrounded blue colour line in the map below
Neoproterozoic Fold Belts

Occupy the eastern part of the Archean Craton (The Mozambique Belt) composed of high grade (amphibolite to granulite facies) metamorphic rocks.
Mineralization in the Neoproterozoic Fold Belt

- Mostly dominated by gemstones in skarn and hydrothermal origin (TANZANITE, RUBY, GARNET, TOURMALINE)
- Gold in shear zones (Handeni – Nkurumu, Magambazi; in Morogoro in Nachingwea, on the Usambara – Pare Montains “Amani and Shengena”) and Placer
- Copper Deposits in shear zones (North Pare, Nachingwea, Mpwapwa, Kilosa, Mbesa)
- Copper, Nickel and PGM (Nachingwea)
- Iron ore and base-metals in mafic rocks (Uluguru - Hundusi, Handeni and Usambara – West of Mombo)
- Graphite (Merelani, Mahenge, Nachingwea)
- Dimension stones (marble and granites) and other Industrial minerals

Neoproterozoic intercratonic cover sediments
Malagarasian Supergroup, Buwanji Group, Kisii Group (Kenya) and Ikorongo Group (Tanzania)

**Mineralization in the Neoproterozoic sediments**
- Strata-bound Copper deposits in Kigugwe
- Precious stones (Chert) – Kakonko
- Stromatolitic Limestones - Kigoma
- Building aggregates from Gagwe Lava and Chaufukwe Lava

**Karoo Sediments (Late Carboniferous-Lower Jurassic)**
These are rift sediments deposited in basins developed during the initial phase of fragmentation of Gondwana

MINERALIZATION:-Main host of Coal deposits

**Jurassic – Paleogene and Neogene – Quaternary Deposits**

**SEDIMENTS**
- Deposition of fluvial red beds in the hinterland
- Initial deposition of marine deposits along the coast (Coral Limestone for cement factories in Mtwara, Tanga and Dar es Salaam)
- Mandawa Gypsum Deposits
- Beach sand with Heavy Mineral Sands

**INTRUSIVE ROCKS**
- The Partial intra-cratonic rift associated with Carbonatite and Kimberlite Intrusions

**WEATHERING ON THE PENEPLANES**
- Bauxite (Usambara –Pare Mountains)
- Kaolin (Matamba Plateau, Uwemba, Usambara-Pare Mts, Pugu)
- Other clays (Ochre, Poultry Clays, Meerschaum, Bentonite)

**Carbonatite Deposits (Mostly Cretaceous except Ngualla which is Proterozoic)**
- ARUSHA (Oldonyo Lengai and Kerimasi)
- MBULU (Oldonyo Dili and Galapo)
- MOROGORO Wigu Hill, Maji ya Weta, Luhombero and Zizi
- MBEYA Ngualla, Panda Hill, Songwe Scarp, Musensi and Senjeri Hill
- KAREMA Sangu-Ikola,
- MALAWI BORDER Nachendezwaya

MINERALS: Carbonatites contain: Phosphate – apatite, Barite, REE, Fluorite and Niobium

Kimberlite Intrusions (Diamond Occurrences) in Tanzania

- Lake Victoria Zone (Mabuki, Kizumbi, New Alamasi, Misungwi, Uduhe, Usongo)
- Singida Zone
- Lake Rukwa Zone
- Songea Zone (in Karoo)
- Masai Plain Zone (Diamonds)

Coastal Geology in Tanzania

- CORAL LIMESTONE at Tanga, Dar Es Salaam - Wazo Hill (DSM), Mbeya- Songwe
  Soda ash in Lake Natron (Arusha) and in Engaruka Basin
- GYPSUM Kilwa (Pindiro, Mandawa)
- HYDROCARBONS Source rocks and reservoirs for hydrocarbon deposits along the coast and in the big lakes

Geological Database

Tanzania has a good geological database at the Geological Survey of Tanzania (GST). Recently, it has completed High Resolution Airborne Geophysical Survey in some potential areas of the country. Interest companies can acquire this geological information at a fee without any complications.