

EQUATORIAL GUINEA

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The territory of Equatorial Guinea includes the islands of Bioko and Annobon, and the mainland enclave of Rio Muni, which is bordered to the north by Cameroon and to the south and east by Gabon. The total surface area of the country is 28,051 km², with mainland Rio Muni accounting for approximately 26,000 km². Rio Muni has a coastal plain and a relatively mountainous interior. The climate is tropical with four seasons (two wet and two dry), and both the enclave and the islands are covered in rain forest. The population of the country is approximately 0.5 million, with growth around 3%. About two-fifths of the population live in the urban areas: the capital, Malabo, on the island of Bioko, and in Bata, the largest town, port and administrative centre on the mainland. Spanish is the official language and French is also widely spoken, English much less so.

Equatorial Guinea is a Democratic Republic with 14 political parties and is governed by a Government of National Unity. There is one legislative house, the Chamber of Representatives of the People, which has 80 seats. Political diversity in the government has been encouraged by the appointment of members from eight different political parties.

Equatorial Guinea's economy traditionally has relied heavily upon agriculture (primarily cocoa, coffee and timber), but recent economic developments have been dominated by rapid growth in the country's oil sector. GDP real growth rate in 2002 is estimated at 20% and industrial production growth rate is estimated at 30% for the same year.

The current phase of oil and gas exploration effectively commenced with a change of government in 1979, the new administration forming a joint venture company that led to the discovery of the Alba Field (gas condensate) in 1983. Although this first-strike was deemed to be non-commercial, further drilling by incoming companies in the early 1990s led to a spate of new discoveries and Alba is now known to be a major gas condensate field with reserves in excess of 4.6 trillion cubic feet. Alba currently produces over 195 million ft³/d of gas to generate 14,000 bbl/d of oil and 2,000 bbl/d of LPG. The processed gas supplies a new methanol plant on the island of Bioko designed to produce at a rate of 19,000 bbl/d with minimal gas flaring, an important factor when it comes to environmental concerns.

In 1995, the Zafiro field (oil and gas) was discovered followed by the Ceiba field in 1999. Oil production from these two offshore fields is now close to 300,000 bbl/d, 80% of it coming from deep-water basins at water depths of greater than 500 m. With a high level of ongoing exploration promising to lead to new discoveries, Equatorial Guinea is set to make a substantial contribution to Africa's hydrocarbon output for many years to come. Currently,

oil, natural gas, condensate and LPG are exported to the US, Europe, and the Far East.

The region is covered by dense rain forest and what little is known of the geology and mineral occurrences of Rio Muni has been gleaned from progressive studies undertaken by the Spanish group, Guineo Espanola de Minas SA (in the mid-1960s), Soviet interests (early 1970s), and the BRGM (during the 1980s).

Between 1980 and 1986, BRGM undertook regional and follow-up stream-sediment surveys utilising heavy mineral separates and sediment geochemistry. These highlighted the potential for gold production from alluvial deposits, as well as the occurrences of colombo-tantalite, diamond-indicator minerals, iron ore, radioactive minerals, rare earths and base metals in other areas.

In the late 1990s, the exploration licence for all of Rio Muni was held by United Meridian Corp (later named Ocean Energy) and BoMc Holdings Inc. These companies undertook a wide range of exploration activities, including regional and prospect geological mapping, reconnaissance evaluation of the gold and bauxite potential of laterites, sampling and prospect evaluation of the artisanal workings, stream sediment sampling, interpretation of high-resolution radar imagery, and the generation of a comprehensive GIS database. At the end of 2000, the licence lapsed and the entirety of Rio Muni has become open for exploration. The GIS database and historical exploration archives are accessible for interested companies upon approval.

Bioko and Annobon are volcanic islands on the Cameroon Volcanic Line, composed predominantly of Cenozoic basalts with little mineral potential, although it provides good quality aggregate for construction purposes. Mainland Rio Muni, however, comprises the Archaean terranes of the Ntem Complex and the Monts de Cristal Massif, both of which were partly reworked during the Proterozoic Eburnian and the Pan-African orogenies. Petrographic, geochemical, and age-dating studies of intrusive rocks of the central and western parts of the enclave, undertaken by the Ministry for Mines and Energy through technical advisers Exploration Consultants Ltd and in conjunction with Australia-based PetroChem Consultants, have revealed four groups of intrusive rock-types (granitic through to gabbroic), with important periods of granite emplacement at about 2.85 Ga and 2.65 Ga respectively. Significant crustal reworking is also indicated, including a Pan-African thermal event. The implications of this new database for gold and other exploration opportunities are being reviewed and publication of the data in the scientific press is anticipated for wider dissemination of the results.

The historical exploration work in Rio Muni has indicated the presence of greenstone belts and major shear zones, including Eburnian terrane boundaries, which have significant gold potential. Pan African transpressional structures are suspected in the west and are associated with granitic intrusions and pegmatite bodies that also occur across the interior. Low-metamorphic-grade shales, dolomites and quartzites occur in the

southwest, representing the northernmost extension of the Niari foreland basin of the Pan-African-age West Congolian Orogeny. Higher-grade sedimentary packages, also attributed to the Pan-African, are found along the northern border of the country where they are associated with major strike-slip and thrust faults.

The coastal strip of Rio Muni comprises Cretaceous sands, shales and carbonates with basal conglomerates, developed during the rifting phase of Atlantic opening. The Fang and Bata Transatlantic Fracture Zones come onshore at Rio Muni, linking to major lineaments, at least one of which shows evidence of Cenozoic rifting (the Benito Rift).

Current minerals production is negligible other than aggregate quarrying (conglomerate, basalt, and occasionally granite) and minor artisanal gold-mining activities in Rio Muni. Nevertheless, several studies have demonstrated the potential for gold, columbo-tantalite and diamond deposits, with previous exploration highlighting several areas of immediate interest. There is also potential for platinum group metals, dimension stone, base metals, and bauxite amongst other commodities.

Historical gold exploration activities and artisanal workings have identified three main areas – Coro, Aconibe and Mongomo on the northern margins of the Monts de Cristal terrane, as well as several other occurrences. These are small alluvial prospects currently yielding coarse gold, including several nuggets that occur with vein-quartz and lateritic minerals, attesting to nearby primary and secondary gold sources. The bedrock sources of the alluvial gold have yet to be delineated. Records are incomplete, but at least 2.3 t of gold were produced from the Coro area alone in the mid-1970s. South of Rio Muni in Gabon, the Monts de Cristal, Du Chaillu and Ogooué terranes have numerous alluvial workings and have been actively explored by international gold mining companies, including the important prospects in the Etéké greenstone belt. During 2003, part of the Coro area was flown for a magnetic and radiometric survey on behalf of a junior company and the results are currently being evaluated prior to possible ground follow-up.

Diamond potential relates in part to post-Eburnian meta-kimberlite dykes that extend along strike from the Mitzic diamond deposits in Gabon into the Nsork area of Rio Muni, 50 km to the north and west. Heavy-mineral sampling results have identified zinc-rich chromites in the Nsork area, similar to those found in the diamondiferous meta-kimberlites in the Mitzic area. Ongoing exploration in Gabon by De Beers (to the east and southeast) and Southern Era Resources (to the south) has identified zinc-chromites and diamonds in alluvial samples right up to the southern borders of Rio Muni.

Colombo-tantalite mineralisation is known in at least two areas (Aconibe and Ayamiken) defined by Nb and Ta soil anomalies, and heavy minerals associated with Nb-Ta-rich pegmatites. Exploration by Afex International Inc and the Ministry of Mines and Energy in 2002 confirmed the common occurrence of tantalite in stream sediments and demonstrated a spatial association with pegmatite bodies first recognised by France's BRGM,

although there is serious doubt as to whether these 'simple' (unzoned) bodies really are the source of the alluvial tantalite.

Widespread lateritisation and indications of aluminous laterite, with grades locally up to 58.3% Al_2O_3 , and 2.1% to 5.3% SiO_2 , indicate possible potential for bauxite, particularly in the east of the country which lies on a wide, dissected plateau. Laterites have also been observed on the Cretaceous shales along the coastal strip. Anomalous values of base metals, U, As, Ag, Mn and Mo have been detected in laterite above black shales which occur in the Noya Series near Cogo. The Noya Series is part of the West Congolian Niari foreland basin, with known base-metal deposits immediately to the south in Gabon, and is also equivalent in age to the Katangan sequences of the Democratic Republic of Congo and Zambia. Serpentinised ultramafics and other basic intrusives along the footwall of the Benito Rift constitute an untested exploration prospect with some potential for base metals and PGM. Similar basic intrusives have also been reported in southern Rio Muni, which may be a northern extension of the Kinguélé ultrabasic trend of northern Gabon, where Ni-Cu-Au-PGM mineralisation is currently under evaluation by Southern Era Resources Ltd.

During 2003, only 1,500 km^2 of Rio Muni was under contract for exploration. Promotional activity undertaken by the Ministry of Mines and Energy has led to ongoing discussion and negotiations with both junior and major exploration companies, mainly in the diamond and gold sectors.

The Ministry of Mines and Energy is keen to develop an exploration-friendly environment, and to this end the Mining Law is being re-drafted. Mining and Exploration is licensed by means of Contract, with model Exploration, Prospect and Exploitation Contracts available. Exploration Contracts permit large areas to be explored (up to 1,000 km^2) over a one- to three-year period. The explorer may also opt for registration of smaller Prospect Areas (up to 100 ha) to permit detailed evaluation of individual prospects. Exploitation Contracts will be granted upon submission of a mining programme that must include environmental management strategies and also meet acceptable health and safety standards in the workplace.

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