# BENIN, CAMEROON, CAPE VERDE, THE CENTRAL AFRICAN REPUBLIC, GABON, SÃO TOMÉ E PRÍNCIPE, AND TOGO

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#### **BENIN**

The production of mineral commodities represented a minor part of the economy of Benin. The economy was largely dependent on agriculture, cotton production, and regional trade; these sectors accounted for more than 80% of the country's gross domestic product (GDP), which was estimated on the basis of purchasing power parity to be about \$8.3 billion in 1999 (the last year for which data are available) (U.S. Central Intelligence Agency, 2000, Benin—Economy, World Factbook, 2000, accessed July 30, 2001, at URL http://www.odci.gov/cia/publications/factbook/geos/bn.html).

All mineral resources belong to the Government, which grants exclusive rights for exploration and development. Regulation of mineral extraction industries rests with the Ministère des Mines, de l'Energie, et de l'Hydraulique. Act No. 83-003 of May 1983 was the Benin Mining Code, Decree 89-296 implemented the Code's regulations, and Act No. 83-004 addressed fiscal policy that affected mineral development. Law No. 98-030 of February 1999 and the Beninese Agency for the Environment addressed national environmental responsibilities. The Office Béninois de Recherches Géologiques et Minières was responsible for mineral development administration duties.

The mineral sector included mining of construction materials and gold and manufacturing of cement production. Formal gold exploration was concentrated in the Natitingou-Perma and the Djougou/Alédjo-Koura areas of the Atacora gold zone in northwestern Benin. Benin's Société des Ciments d'Onigbolo and the clinker-grinders Cimentierie du Bénin S.A. and Société des Ciments du Bénin had a capacity of about 875,000 metric tons per year (t/yr); this was nominally sufficient to fulfill domestic demand that was estimated at just more than 500,000 t/yr (International Cement Review, 2000).

In the petroleum sector, Zetah Oil Co. of Benin signed a 25-year production contract for the Sèmè field. This field had been closed by the Government in 1998 owing to environmental concerns (World Oil, 2000). At the end of 1999, a new oil terminal with an oil capacity of 55,000 cubic meters was opened in the port of Cotonou. It was to serve Benin, Burkina Faso, Mali, and Niger. Importation, distribution, and marketing of fuel products was carried out by the national oil company, Société Nationale de Commercialization des Produits Petroliers (Mbendi Information Services, July 12, 2000, Benin—Oil and gas industry, accessed March 30, 2001, at URL http://www.mbendi.co.za/indy/oilg/af/be/p0005.htm).

In a major example of west African regional cooperation and

good economic planning, a plan was in place to use Nigerian natural gas that was being flared in 2000 to help solve the longterm energy needs of its neighboring states of Benin, Ghana, and Togo. By using Nigeria's more than 40 trillion cubic feet of natural gas reserves, a consortium that was led by Chevron Nigeria Ltd. was committed to building the West African Gas Pipeline by 2002. The \$400 million project will involve the construction of an 800-kilometer (km) offshore gas pipeline from the Niger Delta to the west coast city of Effuasi, Ghana. The pipeline will supply an initial amount of 120 million cubic feet per day of gas to existing and planned powerplants in Benin, Ghana, and Togo. Cooperators in the West African Gas Pipeline project included Nigerian National Petroleum Corp. (NNPC), Ghana National Petroleum Corporation (GNPC), Shell Petroleum Development Company, Société Togolese de Gaz, and SA Société Béninoise de Gaz (Chevron Nigeria Ltd., August 16, 1999, Chevron named project manager for west African gas pipeline project, Press Release, accessed November 9, 2001, at URL http://www.chevrontexaco.com/news/archive/ chevron press/1999/1999-08-16.asp; allAfrica.com, November 13, 2000, West African gas pipeline co-operating for energy security, accessed January 20, 2001, at URL http://allafrica.com/stories/200011130108.html).

Surveys discovered resources of more than 500 million metric tons (Mt) of iron ore that composes from 46% to 52% iron in Loumbou-Loumbou and Madekali in the district of Borgou. Phosphates have been found in an area of several kilometers in Mekrou (Mines '98, 1998, Benin—Geology and mineral deposits, Country Profile, accessed April 16, 2001, at URL http://www.mines98.com/country/bj/3.htm).

Electricity in Benin was provided by the state-owned Société d'Eau et d'Electricite (SBEE). With financial help from the World Bank and the Agence Française de Développement, SBEE launched several programs—a \$30 million interconnection of the North Togo-North Benin networks designed to link up the towns of Dara in Togo and Parakou in Benin, a \$21 million interconnection of the Nigerian Energy Power Authority's network designed to link up Porto Novo and Nigeria via the city of Ikeja, and a dam at Arjarala with a 900-megawatt hydroelectric power station at an estimated cost of \$150 million (Africa Energy & Mining, 2000a).

To attract future investment in the mining sector, the Government continued to seek ways to revise and improve its mining laws. The development of the hydroelectric power station was seen as a key factor in the future potential development of the Loumbou-Loumbou and Madekali iron ore

deposits and the Mekrou phosphate deposits.

#### **CAMEROON**

In 2000, crude oil production, which was the most significant segment of the mineral industry of Cameroon, accounted for nearly 50% (\$989 million) of the country's total exports of \$2.1 billion (World Bank, October 2, 2001, Cameroon at a glance, accessed November 9, 2001, at URL

http://www.worldbank.org/data/countrydata/countrydata.html). Cameroon's GDP in 1999 was estimated to be \$31.5 billion based on purchasing power parity; agriculture, which was the leading sector, accounted for 42% of the GDP. Cameroon had a population of more than 15 million people (U.S. Central Intelligence Agency, 2000, Cameroon—Economy, World Factbook 2000, accessed July 30, 2001, at URL http://www.odci.gov/cia/publications/factbook/geos/cm.html). Cameroon's energy and mineral resources included bauxite, diamonds, gold, limestone, marble, and petroleum.

The Ministère de Mines, d'l'Eau et de l'Energie was responsible for the administration of the mining sector. The state-owned Société Nationale des Hydrocarbures was involved in hydrocarbon production, and the state-owned Société Nationale de Raffinage managed the crude oil refinery (Mbendi Information Services, July 12, 2000, Cameroon—Oil and gas industry, accessed July 30, 2001, at URL http://www.mbendi.co.za/indy/oilg/af/ca/p0005.htm).

The aluminum smelter at Edéa was owned and operated by Compagnie Camérounaise de l'Aluminium (Alucam) [a joint venture of Pechiney of France (58%) and the Government (42%)]. Alucam's alumina was imported from Guinea (Mbendi Information Services, November 15, 2000, Cameroon—Mining, accessed July 30, 2001, at URL http://www.mbendi.co.za/indy/ming/af/ca/p0005.htm).

The region where most of the gold has been discovered is in the eastern part of the country along the borders of the Central African Republic and Chad. The primary gold deposit of Mborguène is located 30 km northeast of Bétaré-Oya. The Government estimated that each year about 15,000 people engage in small-scale artisanal mining of gold. Minor amounts of diamond are also produced each year by small-scale artisanal operations (Mines '98, 1998, Cameroon—Geology and mineral deposits, Country Profile, accessed August 16, 2001, at URL http://www.mines98.com/country/cm/3.htm; Mbendi Information Services, November 15, 2000, Cameroon—Mining, accessed July 30, 2001, at URL http://www.mbendi.co.za/indy/ming/af/ca/p0005.htm).

The main petroleum operators in Cameroon were Elf Serepca, which was a subsidiary of TotalFinaElf of France, Pecten Cameroon Co. (a subsidiary of Shell Exploration and Production Co. of the United Kingdom), and Perenco plc of the United Kingdom. In September, Fusion Oil and Gas plc of the United Kingdom was awarded an exploration permit on Cameroon's deepwater MLHP-1 and MLHP-2 blocks in the Douala/Kribi-Campo basin (Africa Energy & Mining, 2000b).

# **CAPE VERDE**

Mining's contribution to the economy of Cape Verde, which is an archipelago of 10 islands and 8 islets about 600 km off the western coast of Africa, was minimal. In 1999 (the last year for

which data were available), the GDP was estimated to be \$618 million based on purchasing power parity (U.S. Central Intelligence Agency, 2000, Cape Verde—Economy, World Factbook 2000, accessed July 30, 2001, at URL http://www.odci.gov/cia/publications/factbook/geos/cv.html).

Most of the nation's mineral requirements were imported. Salt was produced on the island of Sal, and volcanic rock, primarily pozzolana, was produced on Santo Antao. There also was intermittent production of clay on Boa Vista, Sal, and Sao Vicente; gypsum on Maio; and limestone on Boa Vista, Sal, and Santo Antao. For environmental reasons, the Government strongly discouraged mining beach sand for construction material.

The oil and gas industry was regulated by the Direcao Geral da Energia. The 40,000 t/yr of refined petroleum products that was consumed was imported either from Portugal or other African countries. Distribution and marketing of fuels was carried out by state-owned Empresa Nacional de Combustiveís, s.a.r.l., and Shell Cabo Verde s.a.r.l. No oil or gas was produced domestically; in fact, no oil or gas reserves were known (Mbendi Information Services, August 3, 2000, Cape Verde—Oil and gas industry, accessed March 21, 2001, at URL http://www.mbendi.co.za/indy/oilg/af/cv/p0005.htm).

Economic reforms on the part of the Government aim to develop the private sector, to attract foreign investment, and to diversify the economy. Commerce, transport, and public services will continue to be major components of an economy, which is dependent on foreign aid.

# **CENTRAL AFRICAN REPUBLIC**

In 2000, the mining sector, which was dominated by the production of diamond, accounted for about 4% of the GDP. Agriculture accounted for more than 50% of the country's GDP, estimated to be \$5.8 billion based on 1999 purchasing power parity data (U.S. Central Intelligence Agency, 2000, Central African Republic—Economy, World Factbook 2000, accessed July 30, 2001, at URL http://www.odci.gov/cia/publications/factbook/geos/ct.html). The Central African Republic is a landlocked agrarian nation with a resident population of about 3.6 million in 2000.

After several years of recommending changes to the Government's mining laws, the World Bank took an active role in helping draft new code by sending experts to the Central African Republic as part of a \$20 million loan package. World Bank and International Monetary Fund officials hoped for the acceptance of new legislation that bars the Government administration from involving itself directly in mining ventures; authorizing the sale of oil and gas licenses by auction to conform to the Treaty for Harmonization of African Business Laws, which was signed in 1993; and using international prices as benchmarks (Africa Energy & Mining, 2000c).

Gold was recovered by artisanal miners primarily from the Bandas and the Bogoin-Boali greenstone belts in the western part of the country. The local subsidiary of Axmin Ltd. of the United Kingdom, in joint venture with Asquith Resources, Inc. of Canada, drilled and explored the Roandji gold prospect (Asquith Resources, Inc., October 31, 2000, Axmin initiates follow-up program on the Roandji gold project, accessed November 1, 2000, at URL http://www2.cdn-news.com/scripts/ccn-release.pl?2000/10/31/1031061n.html).

Vaaldiam Resources Ltd. of Canada signed an agreement with United Reef Ltd. of Canada and Trans Hex International Ltd. of Canada to acquire an 80% interest in the Boungou River diamond property. The property is located 80 km north of the town of Bria and contains the Aigbando, the Djourou, and the Trouapou-Boungou alluvial diamond deposits. Expectations were for the production of 30,000 carats per year of diamond (Vaaldiam Resources Ltd., March 2, 2001, Central African Republic, accessed April 2, 2001, at URL http://www.vaaldiam.com/central-africa.html). Other companies holding diamond interests in Central African Republic were Central African Mining Co. s.a.r.l., J.A.B. International, Inc., of the United States, and Minedia s.a.r.l. (a joint venture of Ateba Mines, Inc., of Canada and local companies).

Other mineral occurrences in the Central African Republic included clay, copper, graphite, ilmenite, iron ore, lignite, limestone, manganese, monazite, rutile, tin, and uranium (Mines '98, 1998, Central African Republic, Country Profile, accessed November 9, 2001, at URL http://www.mines98.com/country/cf/3.htm). The lack of adequate transportation and industrial infrastructure hindered the development of the nation's mineral industry. Little of the country's 400,000-square-kilometer (km²) Precambrian terrane has been explored by using modern exploration techniques (Knopf, 1999).

#### **GABON**

The equatorial African nation of Gabon has an area of 257,670 km² and supported a population of about 1.2 million in 2000. The GDP was \$7.9 billion based on 1999 purchasing power parity data. The mineral industry was dominated by crude petroleum production, which accounted for 75% of the country's \$2.4 billion in exports. Manganese was also a major mineral export (U.S. Central Intelligence Agency, 2000, Gabon—Economy, World Factbook 2000, accessed July 30, 2001, at URL http://www.odci.gov/cia/publications/factbook/geos/gb.html). Resources of columbium (niobium), gold, iron ore, and phosphate were known. Ownership of oil and gas and all mineral rights were vested in the Government.

In 1999, Cluff Mining plc of the United Kingdom acquired a 35% interest in Niobium Resources plc of the United Kingdom, which owned the Mabounié carbonatite complex near Lambaréné in the west-central part of the country. Cluff Mining plc reported an indicated resource of 21.6 Mt at a grade of 1.6% columbium (niobium) oxide that contains 345,600 metric tons of columbium (niobium) metal. This mineral resource was the basis for a feasibility study to be completed by 2001 examining the potential to produce 6,000 t/yr of ferroniobium (ferrocolumbium) (Cluff Mining plc, February 7, 2001, Gabon—Mabounie, accessed February 10, 2001, at URL http://www.cluff-mining.com/gabon.htm).

Eramet Manganese, which was 61% owned by the Eramet Group of France, operated the Compagnie Miniere de l'Ogooue S.A. (Comilog) Moanda manganese mine near Franceville. In 2000, manganese production declined to 1.74 Mt. The Moanda Mine had a capacity of 2.5 million metric tons per year with an estimated 100 years of resources (Eramet Group, March 29, 2001, Annual report 2000, accessed July 31, 2001, at URL http://www.eramet.fr/anglais/download/Annual\_Report\_ Global.pdf).

Comilog's \$70 million manganese ore enrichment and sintering plant in Gabon was inaugurated on December 30, 2000. The plant, which is located at Moanda, will have a production capacity of 600,000 t/yr of sintered manganese ore. The new plant will extend the life of the mine by allowing the processing of manganese fines and will provide a direct feed to Eramet's ferroalloy plants (Eramet Group, January 1, 2001, Start-up of the Moanda Industrial Complex in Gabon, accessed July 31, 2001, at URL http://www.eramet.fr/anglais/actionnaires contenul.asp?ID=111).

In 2000, proven reserves of petroleum were estimated to be 2.5 billion barrels (Gbbl) which were nearly double the 1996 figure of 1.3 Gbbl. Production was 325,000 barrels per day (bbl/d), which was slightly below a level of 350,000 bbl/d established and maintained by the Government to ensure a consistent amount of production until new discoveries could be brought into production. The largest oilfield was the Rabi-Kounga Oilfield operated by Shell Oil; estimated reserves were 440,000 million barrels, and production was 150,000 bbl/d. About 20 companies have oil interests in Gabon (Mbendi Information Services, July 12, 2000, Gabon—Oil and gas industry, accessed April 2, 2001, at URL http://www.mbendi.co.za/indy/oilg/af/ga/p0005.htm).

The outlook for the future of minerals development in Gabon is modest and contingent on future market conditions and exploration successes. The economy is likely to be dominated by the petroleum sector for the foreseeable future with the focus of new exploration on deepwater basins. The potential for new developments in columbium (niobium), gold, manganese, and possibly phosphate suggests a continued role for mining in the economy. The lack of adequate infrastructure in many areas of the country inhibits new grassroots exploration and remains a major constraint on development of the well-defined iron ore deposit at Belinga.

# SÃO TOMÉ E PRÍNCIPE

The archipelago of São Tomé e Príncipe is located approximately 275 km west of Gabon and southwest of Equatorial Guinea and Cameroon in west Africa. In 1999 (the last year for which data were available), the GDP was estimated to be \$169 million based on purchasing power parity (U.S. Central Intelligence Agency, 2000, São Tomé e Príncipe—Economy, World Factbook 2000, accessed July 30, 2001, at URL http://www.odci.gov/cia/publications/factbook/geos/tp.html). The São Toméan economy was dominated by agriculture; the mineral industry was not significant.

The oil and gas industry in São Tomé e Príncipe is regulated by the Ministry of Industry, Construction, and Housing. Refined petroleum products, as well as most manufactured goods and food, were imported from neighboring countries. In early 2001, Government officials announced an agreement with Nigerian officials regarding disputed offshore areas in the São Toméan part of the Gulf of Guinea; according to the signed treaties, Nigeria and São Tomé will obtain 60% and 40%, respectively, of the revenues from oil exploration in these areas (Africa Energy Intelligence, 2000; afrol.com information services, March 24, 2001, São Tomé reaches agreement on oil exploration with Nigeria, accessed August 1, 2001, at URL http://www.afrol.com/NEWS2001/stp001\_oil\_nigeria.htm).

#### **TOGO**

In 2000, mining played a minor role in Togo's economy. In 1999 (the last year for which data are available), the GDP was estimated to be \$8.6 billion based on purchasing power parity; agriculture, which was the leading sector, accounted for 42% of the GDP (U.S. Central Intelligence Agency, 2000, Togo— Economy, World Factbook 2000, accessed July 30, 2001, at URL http://www.odci.gov/cia/publications/factbook/geos/to.html).

The Government pursued the privatization of its phosphate mines, which were operated by the Office Togolais des Phosphates; no serious offers, however, were made. Total production of phosphate continued to steadily decline in 2000; it dropped to 1.4 Mt after reaching a high of 2.7 Mt in 1996 (Africa Mining Intelligence, 2001).

As a condition for financial backing of its energy sector by the World Bank, the Togoese Government succeeded in the privatization of Compagnie d'Energie Electrique du Togo to Elyo/Hydro Quebec International of Canada. Part of the agreed upon 20-year contract was the establishment of a new company named Togo Electricite of which Elyo/Hydro Quebec International would be the main shareholder. Togo Electricite was expected to invest 40 million euros during a 5-year period to rehabilitate and develop the production and distribution infrastructure (Africa Energy & Mining, 2000d).

Togo's mineral industry included the mining of limestone and phosphate rock and the manufacturing of cement and clinker for the export market. There was some artisanal recovery of diamond and gold. Other mineral occurrences, which included attapulgite, barite, bauxite, bentonite, brick clay, dolomite, garnet, gypsum, iron ore, kaolin, kyanite, limestone, manganese, marble, monazite, peat, rutile, silica sand, and dimension stone, were known, and the Government considered many of the occurrences to be potential small-scale operations (Ministry of Mines, Energy, and Water Resources, 1995, p. 24-27, 29-34, 36-37, 39-50, 52, and 54-55).

Using Nigeria's more than 40 trillion cubic feet of natural gas reserves, a consortium (led by Chevron Nigeria Ltd.) committed to build the West African Gas Pipeline by 2002. An 800-km offshore gas pipeline will be constructed from the Niger Delta to the west coast city of Effuasi, Ghana, and supply an initial amount of 120 million cubic feet per day of gas to existing and planned powerplants in Benin, Ghana, and Togo (Chevron Nigeria Ltd., August 16, 1999, Chevron named project manager for west African gas pipeline project, accessed November 9, 2001, at URL http://www.chevrontexaco.com/news/archive/chevron\_press/1999/1999-08-16.asp; allAfrica.com, November 13, 2000, West African gas pipeline co-operating for energy security, accessed January 20, 2001, at URL http://allafrica.com/stories/200011130108.html).

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# **Major Sources of Information**

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TABLE 1
BENIN, CAMEROON, THE CENTRAL AFRICAN REPUBLIC, GABON, AND TOGO: ESTIMATES PRODUCTION OF MINERAL COMMODITIES 1/2/

# (Metric tons unless otherwise specified)

Commodity 3/	1996	1997	1998	1999	2000
BENIN					
Cement, hydraulic	360,000	450,000	520,000	450,000	450,000
Gold kilograms	300	500	500	500	500
Petroleum, crude thousand 42-gallon barrels	600	400	200		
CAMEROON					
Aluminum metal, primary	82,000	91,000 r/	82,000 r/	92,000 r/	95,000
Cement, hydraulic	600,000	620,000	450,000	500,000 r/	500,000
Gold, mine output, Au content kilograms	1,000	1,000	1,000	1,000	1,000
Petroleum:					
Crude thousand 42-gallon barrels	33,945 4/	43,000	45,000	47,000	47,000
Refinery products do.	9,200	9,200	10,000	10,000	10,000
Pozzolana	80,000	100,000	105,000	90,000	90,000
Sand, silica	12,000	12,000	12,500	12,000	12,000
Stone:					
Limestone	50,000	50,000	50,000	50,000	50,000
Marble thousand cubic meters	560	560	580	580	580
Tin, ore and concentrate:					
Gross weight kilograms	r/	r/	r/	r/	
Sn content do.	r/	r/	r/	r/	
CENTRAL AFRICAN REPUBLIC					
Diamond carats	470,000	500,000	530,000	530,000 r/	530,000
Gold kilograms	90	90	100	100	100
GABON					
Cement:					
Clinker	162,000	176,000	180,000	180,000 4/	180,000
Cement, hydraulic 5/	185,000	205,000	196,000 4/	200,000 r/	200,000
Diamond, gem and industrial carats	500	500	500	500	500
Gas, natural, gross million cubic meters	100	99	99	99	99
Gold, mine output, Au content 6/ kilograms	70	70	70	70	70
Manganese:					
Metallurgical-grade ore, gross thousand metric tons	1,933	1,860	2,044	1,908 r/	1,700
weight (50% to 53% Mn)	,	,	,	,	,
Pellets, battery- and chemical-grade, gross weight do.	50	44	48	44 r/	40
(82% to 85% MnO <sub>2</sub> )					
Petroleum:					
Crude thousand 42-gallon barrels	134,000	134,000	132,000	124,500	124,500
Refinery products do.	6,043	6,315 4/	6,200 4/	6,315	6,315
Uranium, content of concentrate	623	472 4/	862 4/	347 7/	7/
TOGO 8/	023	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	002 ./	3.7 77	.,,
Cement 9/	413,000	421.000	565.000	560,000	560,000
Iron and steel, semimanufactures 10/	500				
Phosphate rock, beneficiated product:	200				
Gross weight thousand metric tons	2,731	2,631	2,253	1,700	1,400
P2O5 content do.	980	950	810	600	350
r/Revised Zero	700	750	010	000	330

r/ Revised. -- Zero.

- 1/ Includes data available through August 1, 2001.
- 2/ Estimated data are rounded to no more than three significant digits.

- 5/ Includes cement produced from imported clinker.
- 6/ Gold production figures do not include production smuggled out of the country, which, in recent years, was estimated to exceed 400 kilograms per year.
- 7/ Moanda uranium mine depleted and closed in 1999.
- 8/ Togo also presumably produced diamond and gold, but output is not reported, and available information is inadequate to make reliable estimates of output levels.
- 9/ Produced from imported clinker.
- 10/ Iron rod production from semifinished metal.

<sup>3/</sup> In addition to the commodities listed, a variety of industrial minerals and construction materials (clays, gypsum, sand and gravel, and stone) are produced, but information is inadequate to make reliable estimates of output.

<sup>4/</sup> Reported figure.