

AFRICA

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The 55 independent nations and other territories of continental Africa and adjacent islands covered in this volume encompass a land area of 30.3 million square kilometers, which is more than three times the size of the United States, and were home to 832 million people in 2002. For many of these countries, mineral exploration and production constitute significant parts of their economies and remain keys to future economic growth. Africa is richly endowed with mineral reserves and ranks first or second in quantity of world reserves of bauxite, cobalt, diamond, phosphate rock, platinum-group metals (PGM), titanium minerals (rutile and ilmenite), vermiculite, and zirconium.

The minerals industry was an important source of export earnings for many African nations in 2002. To promote exports, groups of African countries formed numerous trade blocs, which included the Economic and Monetary Community of Central Africa, the Economic Community of the Great Lakes Countries, the Common Market for Eastern and Southern Africa, the Economic Community of Central African States, the Economic Community of West African States, the Mano River Union, the Southern African Development Community, and the West African Economic and Monetary Union. Algeria, Libya, and Nigeria were members of the Organization of the Petroleum Exporting Countries (OPEC). The African Union was formally launched as a successor to the Organization of African Unity in 2002 to accelerate socioeconomic integration and promote peace, security, and stability on the continent.

In 2002, significant events in the minerals industry of Africa included the opening of new gold mines in South Africa and Tanzania; high rates of economic growth in Angola, Equatorial Guinea, and Mali, which were attributable to increasing mineral production; the United Nations report on the alleged illegal exploitation of mineral resources in the Democratic Republic of Congo [Congo (Kinshasa)] by Rwanda, Uganda, and Zimbabwe; and the Kimberley Process agreement on diamond certification.

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For mineral production statistics—

- Algeria—Ministry of Energy and Mines,
- Angola—Ministry of Mines and Ministry of Petroleum,
- Benin—Ministry of Mines, Energy, and Water Resources,
- Botswana—Ministry of Mines,
- Burkina Faso—Ministry of Mines, Quarries, and Energy,

- Burundi—Ministry of Energy and Mines,
- Cameroon—Ministry of Mines, Water, and Energy,
- Congo (Brazzaville)—National Center of Statistics and Economic Studies,
- Egypt—Central Agency for Public Mobilization and Statistics,
- Eritrea—Department of Mines,
- Gambia—Department of State for Trade Industry and Employment,
- Ghana—Minerals Commission,
- Kenya—Mines and Geology Department,
- Lesotho—Ministry of Natural Resources and Department of Mines and Geology,
- Madagascar—Ministry of Energy and Mines,
- Malawi—Department of Mines,
- Morocco—Ministry of Energy and Mines,
- Mozambique—National Directorate of Mines,
- Namibia—Ministry of Mines and Energy,
- Niger—Ministry of Mines and Energy,
- Nigeria—Ministry of Solid Minerals Development,
- Rwanda—Ministry of Infrastructure,
- Senegal—Ministry of Mines, Energy, and Water,
- Seychelles—Ministry of Industries and International Business,
- Sierra Leone—Director of Mines,
- South Africa—Department of Minerals and Energy, Mineral Economics Directorate,
- Tanzania—Ministry of Energy and Minerals,
- Uganda—Geological Survey and Mines Department,
- Zambia—Mines Development Department, and
- Zimbabwe—Chamber of Mines.

For basic economic data—the International Monetary Fund in the United States.

For minerals consumption data—

- British Petroleum plc,
- MEPS (International) Ltd.,
- United Nations Food and Agricultural Organization,
- U.S. Department of Energy in the United States, and
- World Bureau of Metal Statistics.

For exploration and other mineral-related information—the Metals Economics Group in Canada.

General Economic Conditions

In 2002, the gross domestic product (GDP) of Africa grew by 3.1% after increasing by 3.7% in 2000. From 1997 to 2002, Africa's GDP grew at an average rate of about 3.1%. In 2002, Angola and Equatorial Guinea achieved the most rapid

economic growth in Africa with GDP increases of 15.3% and 13.3%, respectively. The expansion of the crude petroleum industry was a major factor in the performance of Angola's and Equatorial Guinea's economy. In Mali, higher gold production contributed to an overall GDP growth rate of 9.7%; the nonmining GDP grew by 8.2%. Nigeria's GDP growth slowed to 0.5% in 2002 from 2.8% in 2001 because of lower petroleum production (International Monetary Fund, 2003, p. 180).

The International Monetary Fund (2003, p. 50-51, 180, 232) predicted that Africa's GDP would increase by 3.7% in 2003, 4.8% in 2004, and 4.9% per year from 2005 to 2008. GDP growth in African oil exporting countries was expected to rise to 5.5% in 2003 and 4.2% in 2004. In oil importing countries, GDP growth was expected to be 3.2% in 2003 and 4.9% in 2004. In 2003, the effects of the global economic recovery and rising nonfuel commodity prices were likely to be offset by adverse weather conditions, local conflicts, geopolitical uncertainty, and political instability. Higher GDP growth after 2003 depended upon increasing political stability and the absence of natural disasters.

In South Africa, GDP growth was expected to be 2.2% in 2003 and 3% in 2004. The economy of Egypt was expected to grow by 2.9% in 2003 and 3% in 2004. In Morocco, the economy was predicted to grow by 5.5% in 2003 and 3.4% in 2004. Algeria's GDP growth was expected to rise to 5.9% in 2003 before falling to 3.8% in 2004. Nigeria's GDP was expected to rise by 5.2% in 2003 and 2.8% in 2004 because of higher oil production (International Monetary Fund, 2003, p. 180-181).

Investment Data and Political Risk

A recent review of company investment plans for the period from 2002 to 2007 indicated the potential for the region to attract about \$80 billion in oil and gas development, of which more than 50% would be in Angola and Nigeria. Algeria, Chad, and Egypt were also likely to be substantial destinations for oil and gas investment. About \$38 billion of investment was planned for mining and mineral processing projects. The most important destinations for mining and mineral-processing investments were expected to be, in order of importance, South Africa, Mozambique, Ghana, Zambia, and Congo (Kinshasa). Copper projects were likely to be concentrated in Zambia; gold, in South Africa and Ghana; PGM, in South Africa and Zimbabwe; and titanium minerals, in Mozambique.

Countries directly affected by wars, internal ethnic or political conflicts, and refugee displacements in 2002 included Algeria, Angola, Burundi, Central African Republic, Chad, Republic of the Congo [Congo (Brazzaville)], Congo (Kinshasa), Côte d'Ivoire, Guinea, Guinea-Bissau, Liberia, Madagascar, Nigeria, Rwanda, Somalia, Sudan, Uganda, and Zimbabwe. During 2002, peace treaties were signed in Angola and Congo (Kinshasa), and national elections were held in Sierra Leone, signaling an end to prolonged civil wars in these countries and the start of the long process of rebuilding functioning political and economic institutions.

The Governments of Rwanda and Uganda started the withdrawal of their military forces from Congolese territory in return for a pledge from the Government of Congo (Kinshasa)

to disarm and return the Interahamwe militia to Rwanda. In October, the United Nations Security Council issued a report that accused Rwandan Government officials, military officers, and businessmen of illegally mining columbium (niobium), diamond, gold, and tantalum from Congo (Kinshasa) to enrich themselves and finance their country's military presence in Congo (Kinshasa). Others accused of taking advantage of the war in Congo (Kinshasa) to mine Congolese mineral resources included Ugandan military officers and businessmen; rebel forces that operated in Congo (Kinshasa); a network of Congolese and Zimbabwean commercial, military, and political interests; and Lebanese diamond traders that were alleged to have ties with Hezbollah. The charges were denied by the Governments of Rwanda and Zimbabwe; the Government of Uganda was investigating the accusations.

Legislation

In 2002, the South African Government passed the Minerals and Petroleum Resources Development Act. This legislation was designed to give the state exclusive custodianship of all mineral rights and focused on the freeing up of unexploited mineral rights long held by the major mining houses to provide more opportunities in the mining sector for black South African entrepreneurial groups and for foreign investment.

With the assistance of the World Bank, a new mining code was passed by the Parliament of Congo (Kinshasa) in July. The law promotes mineral development by the private sector with the principal role of the state to promote and regulate the development of the mining industry by the private sector. Mining rights are vested with the state. The law governs the prospecting, exploration, exploitation, processing, transportation, and sale of mineral substances. Specific Government agencies were assigned responsibilities for processing applications for mining rights, promoting the mining sector through geological research, enforcing environmental and safety regulations, and publishing production statistics. Other aspects of the legislation included corporate tax rates, royalties, the transferability and convertibility of foreign currency, limits on expropriations of mines, terms of compensation to land owners affected by mining, and provisions for dispute settlement by domestic and international arbitration.

The Government of Mozambique passed legislation that provided guarantees to owners of mining concessions, allowed small-scale and artisanal miners to be given exclusive rights on a specific zone, and appropriated funds for creating geologic maps showing mineral resources. The Government hoped to increase the mining sector's share of the GDP to 10%.

In the Atlantic, the Nigeria-Sao Tome e Principe Joint Development Authority was established to resolve the problems that had developed with offshore petroleum exploration in an area of overlapping exclusive economic zones.

In January, the Mauritanian Parliament adopted a mining model agreement that outlines a taxation formula for mining companies. This agreement concerns the economic, customs, fiscal and foreign exchange conditions under which mining investment can be made in Mauritania, but does not change any of the provisions in the 1999 Mining Code.

Exploration

Exploration activity, as defined by reported company exploration budgets for Africa, continued to decline to about \$257 million in 2002 from \$277 million in 2001. The Metals Economics Group reported a decrease in exploration spending for Africa of about 7% from the 2001 level. Africa actually increased in terms of worldwide allocation, to almost 15% in 2002, compared with 14% in 2001 (Wilburn, 2003).

Africa had new mineral production potential and a high degree of investment risk. In 2002, a decreased threat of civil unrest led to increased exploration in some parts of Africa. Civil wars, internal ethnic or political conflicts, and refugee displacements continued to hinder new investment in mineral exploration in other African countries. Some international mining companies were unwilling to invest substantially in some areas of Africa because of their perceived long-term political instability, increased incidence of HIV/AIDS, and a lack of recent base metal development because of falling prices, weak infrastructure, and other factors. Others, however, expressed optimism over the future development of African mining (Wilburn, 2003).

The movement of some major exploration groups out of South Africa and political instability in Zimbabwe has affected mineral exploration in southern Africa. Lower copper prices and political instability have hampered the revival of exploration and development of mineral resources in the Central African Copperbelt of Congo (Kinshasa) and Zambia. Exploration for PGM in the Bushveld Complex of South Africa has increased. In Tanzania, initial production results from the Bulyanhulu gold mine have spurred new exploration in the region. A number of projects have been suspended in Ghana pending clarification of Government policy on mining in forested areas (Wilburn, 2003).

In 2002, African countries that experienced the highest levels of exploration activity were, in descending order by exploration activity based on site data collected for this annual review, South Africa, Tanzania, Ghana, Mali, Guinea, Zambia, and Botswana. Gold accounted for approximately 55% of the reported exploration spending; diamond, 16%; base metals, 15%; and PGM, 13%. Exploration for gold was greatest in Ghana, Mali, and Tanzania; exploration also continued in Botswana, Burkina Faso, and Guinea (Wilburn, 2003).

Guinea, Namibia, and South Africa were the primary targets for diamond exploration and development. In Namibia, offshore diamond exploration stimulated a mining sector that has declined in recent years. Exploration for PGM continued, particularly in South Africa and Zimbabwe (Wilburn, 2003).

After the events of September 11, 2001, reports appeared that al Qaeda had profited from purchasing diamond in Congo (Kinshasa) and Sierra Leone. Additionally, previous reports alleged that Africa's mineral resources (diamond, gold, and, more recently, tantalum) have been used to finance border conflicts and civil wars that have destabilized several central African countries. The United Nations issued a report that recommended a moratorium on exports of such high-value commodities as cobalt, columbite-tantalite, copper, and gold from Congo (Kinshasa) and countries that support terrorist activities. On January 1, 2003, an international initiative of

about 35 countries to address the connection between rebel-directed conflicts and rough diamond trade, which is known as the Kimberley Process, implemented a certification process for monitoring illicit rough diamond trade. The United Nations Security Council endorsed the process in a resolution on January 28, 2003 (Wilburn, 2003).

Commodity Review

Estimates for production of major mineral commodities for 2003 and beyond have been based upon supply-side assumptions, such as announced plans for increased production/new capacity construction and bankable feasibility studies. No explicit consideration of any demand-side factors, such as price and economic growth, was made.

Metals

Africa's share of world base-metals production and consumption was modest. The mine production of bauxite, copper, gold, iron ore, lead, silver, and tin was less than that of 1990. The low level of consumption was the result of Africa's low level of industrialization. In 2002, Africa was a net exporter of aluminum, copper, nickel, and zinc. Africa was also a net exporter of iron ore; its share of world steel consumption was about 2%. South Africa was the leading consumer of base metals and steel in Africa; it had 5% of the continent's population but accounted for a majority of African aluminum, copper, lead, nickel, steel, tin, and zinc consumption (table 1).

Africa produced about one-half of the world's cobalt mine output and one-quarter of the world's refined cobalt, and more than one-quarter of the world's manganese mine output. South Africa was the world's leading producer of chromite and ferrochromium, gold, and platinum, and the world's second leading producer of ferromanganese, manganese ore, palladium, rutile, vanadium, and zircon.

Aluminum and Bauxite.—*Production.*—African production of refined aluminum rose by nearly 2% from 2001. The increase was mostly attributable to higher production at the Hillside smelter in South Africa. In Mozambique, output rose by about 3% at the Mozal smelter. Production fell sharply in Ghana because of a drought that forced power cuts at Volta Aluminium Company (VALCO). South Africa accounted for 51% of African aluminum output; Mozambique, 20%; and Egypt, 14% (table 6). Kenya was the only African producer of secondary refined aluminum. Africa accounted for 4% of the world's aluminum production in 2002 (table 4).

African bauxite production rose by about 1% in 2002. From 1990 to 2002, Africa's share of world bauxite production fell to 11% from 16%. Guinea accounted for 96% of African bauxite production; Ghana accounted for most of the remainder (table 5). In 2002, Guinea was the only African producer of alumina; its output was 670,000 metric tons (t), or about 1% of world alumina production.

Consumption.—Africa's share of world primary aluminum consumption in 2002 was about 1%. Continental consumption fell by about 5% in 2002 but was still 24% above the level

reached in 1997. South Africa accounted for about 50% of African primary aluminum consumption, and Egypt, about 25% (World Bureau of Metal Statistics, 2001, p. 9; 2003, p. 9).

Outlook.—After rising by nearly 4% in 2003, the production of refined aluminum is expected to rise by an average of about 8% per year from 2003 to 2007. In South Africa, expansion of the Hillside smelter would likely add 130,000 metric tons per year (t/yr) of new capacity by 2004. Aluminum Smelter Co. of Nigeria Ltd. is expected to reopen its smelter at Ikot Abasi by 2005. The expansion of the Mozal smelter in Mozambique and Misr Aluminum's plant in Egypt were likely to increase production in 2003. By 2007, Mozambique, which was not a producer of refined aluminum before 2000, is expected to account for more than 25% of African refined aluminum production (table 6). In Ghana, the VALCO smelter shut down in early 2003; the future was uncertain for this plant. The outlook for African bauxite production is an increase to 17.3 million metric tons (Mt) in 2005 from 16.1 Mt in 2003 (table 5). Preliminary data for 2003 show an increase in Guinea's alumina production.

Guinea and Sierra Leone have other projects that may result in further increases in African alumina and bauxite production, but these projects may not be implemented by the end of 2007. These projects include a doubling of the capacity of the Friguia alumina plant in Guinea and Sierra Minerals Holdings' bauxite mine in Sierra Leone.

Copper.—Production.—In 2002, Africa's mine production increased by 5% from 2001. Zambia was the leading producer in Africa; its output increased because of higher production from the Mufilira and Nkana Mines. Production also increased in Congo (Kinshasa) and Namibia. The decrease in South Africa's production was partially attributable to lower output from the Palabora Mine as it made the transition from an open pit to an underground mine. In 2002, Zambia accounted for 61% of African copper mine production; South Africa, 24%; and Congo (Kinshasa), 6%. African copper mine production was down sharply from its 1990 level; Africa's share of world copper mine output fell to 4% in 2002 from 14% in 1990 (tables 4, 7).

Africa's refined copper production remained nearly unchanged in 2002. The rise in Zambian output was offset by falling output in South Africa and Congo (Kinshasa). In 2002, Zambia accounted for 71% of African refined copper production, and South Africa, 21% (table 8). Egypt was the only producer of secondary refined copper; primary production accounted for most African production. From 1990 to 2002, Africa's share of world refined copper output fell to 3% from 8%.

Consumption.—In 2002, African consumption of copper rose by 5% compared with 2001 and 23% compared with 1997. Africa's share of the world's copper consumption was 1%. South Africa accounted for more than 50% of regional copper consumption, and Egypt, about 25%. Zambia and Zimbabwe consumed most of the remainder (World Bureau of Metal Statistics, 2001, p. 41; 2003, p. 41).

Outlook.—After rising by more than 10% in 2003, copper mine production is expected to rise by an average of nearly 14% per year from 2003 to 2007. Output is expected to increase sharply in Zambia because of the startup of the Chambishi,

Kansanshi, and Lumwana Mines and increased production from the Mufalira and Nkana Mines. By 2007, Zambia's share of African copper mine production was expected to rise to 71%. Copper mine production in Congo (Kinshasa) was also likely to rise; the increase would be partially attributable to the startup of the Dikulushi and Lonshi Mines and the Kolwezi Tailings Project. South African production is likely to decrease (table 7).

Ore from the Lonshi Mine is also expected to contribute to a higher output of refined copper in Zambia. By 2007, Zambia's share of African refined copper production is expected to be 82%. After falling by more than 7% in 2003, Africa's production of refined copper is expected to rise by an average of 17% per year from 2003 to 2007 (table 8).

Gold.—Production.—Africa's gold mine production was 619,000 kilograms in 2002, which was an increase of 4% compared with that of 2001. Production, however, was still less than that of 1990 because of the long-term decline in South African production. From 1990 to 2002, Africa's share of world gold mine production fell to about 25% from 32% (tables 4, 9).

Production increased slightly in Ghana and South Africa in 2002. In South Africa, higher production from the Free State and West Wits Lane gold fields more than offset lower production from the East Rand, Evander, Klerksdorp, and West Rand gold fields. In Ghana, higher production was partially attributable to the expansion of the Bogoso Mine.

Mali's output increased by nearly one-third because of higher production at the Morila and Yatela Mines. Tanzania's gold production rose by nearly one-quarter with the opening of the North Mara Mine and increased output at the Bulyanhulu and Geita Mines. In Guinea, the opening of the Kiniero Mine and higher production at the Lero Mine offset falling production at the Siguiro Mine. In 2002, South Africa accounted for 64% of African gold production; Ghana, 11%; Mali, 9%; and Tanzania, 6%. South Africa's share of continental gold production (64%) in 2002 had fallen from 81% in 1995 and 89% in 1990 because of rising production costs associated with less accessible resources and higher production in Ghana, Guinea, Mali, and Tanzania (table 9).

Outlook.—The long-term decline in African gold production is likely to be reversed. After falling by about 4% in 2003, gold mine production is expected to rise by an average of 4% per year from 2003 to 2007. South African output is likely to rise to 450 t in 2007 compared with 420 t in 2005 and 378 t in 2003. The increase in production would be partially attributable to the commissioning of the Doomkop Southreef, Moab Khotsong, South Deep, and Target Mines. The appreciation of the rand against the dollar, however, could negatively affect South African gold production. Ghana's gold production was likely to reach nearly 85 t in 2007 with the development of the Ahafo and Akyem Mines, the reopening of the Wassa Mine, and the expansion of the Tarkwa Mine (table 9).

By 2007, output in Tanzania is likely to rise to nearly 57 t with the opening of the Buhemba and Tulawaka Mines and the increased capacity at the Bulyanhulu, Geita, and North Mara Mines. In Guinea, the expansion of the Siguiro Mine in 2005 and the Lero Mine in 2006 is expected to contribute to higher production. In Mali, production is expected to fall to about 46 t in 2003 before rising to about 50 t in 2007; the opening of

the Loulo, Syama, and Tabakoto Mines would be more than offset by falling production at the Morila Mine and the closure of the Yatela Mine in 2006 (table 9). Other significant mine openings included the Samira Hill in Niger, the Taparko in Burkina Faso, and the Tasiast in Mauritania.

Iron Ore.—Production.—In 2002, the iron content of ore produced in Africa rose to 31.8 Mt in 2002 from 31.4 Mt in 2001. South Africa's production rose because of higher output at the Sishen Mine. In Mauritania, output from Société Nationale Industrielle et Minière (SNIM) fell by 7.5%. The decrease in Zimbabwe's production may be attributable to lower output in Zimbabwe's steel industry. South Africa was the leading iron ore producer in Africa; its share of continental output amounted to 73%. Mauritania's share was 19% in 2002. In 1990, South Africa, Mauritania, and Liberia accounted for 60%, 21%, and 8%, respectively, of output (table 10). Africa's share of world iron ore production was 5%.

Outlook.—The iron content of ore produced in Africa is expected to rise to 33.9 Mt by 2007 (table 10). The increase would be attributable to higher production from SNIM's mines in Mauritania and the expansion of the Sishen Mine in South Africa.

Iron and Steel.—Production.—Africa's production of direct-reduced iron (DRI) and pig iron increased by about 2% in 2002. Higher production of DRI in Egypt, Libya, and South Africa more than offset lower production of pig iron in Tunisia and Zimbabwe. Tunisia's production fell because of the shutdown of El Fouladh-Société Tunisienne des Siderurgie's blast furnace. From 1990 to 2002, South Africa's share of total African iron production fell to 53% from 66%. During the same period, Egypt's share rose to 28% from 15%. Algeria and Libya accounted for most of the remainder in 2002 (table 11). Africa's share of world iron production was 2%.

From 1990 to 2002, the share of DRI in total African iron production rose to 38% from 19%. During the same period, the share of DRI in total iron production in Egypt increased to 64% from 39%; and in South Africa, to 23% from 13% (table 11).

In 2002, African production of crude steel increased by 7% compared with that of 2001. Egypt, which was the second leading African producer, accounted for about one-half of the increase in continental steel production; Algeria and South Africa accounted for most of the remainder. Zimbabwe's production fell by nearly one-third in 2002; the Zimbabwe Iron and Steel Company lacked working capital to pay for coal, transportation, and other costs. Tunisia's output fell because of the shutdown by El Fouladh-Société Tunisienne des Siderurgie's blast furnace. South Africa accounted for 57% of regional crude steel production; Egypt, 27%; and Algeria, 7%. Africa's share of world crude steel production amounted to 2% in 2002 (tables 4, 12).

South Africa produced about 6.74 Mt of hot-rolled steel products in 2002 compared with 6.4 Mt in 2001. Other African producers of hot-rolled steel products included Algeria, Egypt, Libya, Morocco, and Tunisia (International Iron and Steel Institute Committee on Economic Studies, 2004, p. 52).

Consumption.—Africa accounted for 2% of global finished steel consumption. Africa consumed 17.8 Mt of finished steel

products in 2002, which was an increase compared with 16.6 Mt in 2001 and 15.1 Mt in 1997. From 1997 to 2002, South Africa's consumption of steel products rose to 4.85 Mt from 4.47 Mt. Egypt's consumption fell to 3.66 Mt from 4.55 Mt; Algeria's consumption increased to 2.2 Mt from 892,000 t; and the demand for steel by other African countries rose to 7.08 Mt from 5.22 Mt (International Iron and Steel Institute Committee on Economic Studies, 2004, p. 91-92).

Outlook.—After rising by nearly 2% in 2003, the production of DRI and pig iron is expected to rise by an average of 1% per year from 2003 to 2007. In South Africa, the output of pig iron is likely to rise to 6.5 Mt in 2005. Most of the increase in South Africa would be the result of byproducts from titanium heavy mineral sands developments. Egypt's production of DRI is expected to rise (table 11).

After falling by more than 4% in 2003, crude steel production is expected to rise by an average of about 2% per year from 2003 to 2007. Libyan output is expected to rise to about 1.3 Mt in 2007 from 886,000 t in 2002. In Morocco, Société Nationale de Siderurgie plans to build a new electric arc furnace at its Jorf Lasfar facility; the plant is likely to start production in 2005. Production is likely to rise in Zimbabwe and to fall in Egypt. In Algeria, production is expected to fall sharply in 2003 before rising in 2005 (table 12).

Regional consumption of finished steel is expected to increase by more than 5% in 2003 and between 2% and 3% from 2003 to 2007. During this period, Africa's share of world steel consumption is unlikely to change.

Lead.—Production.—In 2002, African lead mine production fell by 2% from 2001 and 19.9% from 1995. Output fell in Morocco and South Africa, which were the two largest producers of lead ore in Africa, and increased in Algeria and Namibia. South Africa's production fell because of lower output from the Black Mountain Mine. In Namibia, the increase in output was attributable to the Rosh Pinah Mine. Lower production from the Bougrine Mine caused Tunisia's output to fall by nearly 26% in 2002. Morocco accounted for 52% of African lead mine production; South Africa, 34%; and Namibia, 10% (table 13). Africa's share of the world's lead mine production was 5% (table 4).

In 2002, African production of primary refined lead rose by 21%; the increase was attributable to the refinery operated by Société des Fonderies de Plomb de Zellidja (SFPZ) in Morocco. Morocco, which was the leading African producer of primary refined lead, accounted for 92% of continental output (table 14).

South Africa accounted for 85% of African secondary refined lead output; in 2002, African production of secondary refined lead fell by 5%. Nigeria, Morocco, and Kenya accounted for the remainder of African secondary lead production. The share of primary lead in total refined lead production in Africa fell to 57% in 2002 from 64% in 1995 and 72% in 1990 (tables 14 and 15).

Consumption.—In 2002, continental refined lead consumption was 5% higher than that of 2001. Africa's share of the world's lead consumption was nearly 2%. South Africa accounted for more than 50% of regional lead consumption, and Algeria, nearly 20% (World Bureau of Metal Statistics, 2001, p. 82; 2003, p. 82).

Outlook.—The decline in African lead production is likely to be reversed. After rising by 8% in 2003, lead mine production is expected to rise by an average of 1% per year from 2003 to 2007. African production would, however, still be less than that of 2000. By 2005, output in Morocco was likely to rise by 20%. Production was also expected to rise in Namibia. Tunisia's output was expected to fall with the closure of the Bougrine Mine (table 13).

Nickel.—*Production.*—African mine production of nickel rose by 2% in 2002; nickel was produced exclusively in southern African countries. Production rose in Botswana and South Africa; higher output in Botswana was attributable to the Phoenix Mine. Production fell sharply in Zimbabwe. In 2002, South Africa accounted for 58% of African nickel mine output; Botswana, 30%; and Zimbabwe, 12% (table 16). Africa's share of world nickel mine production was 5%.

Consumption.—In 2002, demand for refined nickel rose by 6% from 2001 and 26% from 1997. Africa accounted for 3% of the world's nickel consumption. Within the region, South Africa accounted for most of Africa's nickel demand; the country produced 550,000 t of stainless steel in 2002 (World Bureau of Metal Statistics, 2001, p. 105; 2003, p. 105).

Outlook.—After rising by nearly 6% in 2003, nickel mine production is expected to more than double from 2003 to 2007. The startup of the Ambatovy nickel and cobalt mine by 2007 in Madagascar would account for the majority of the increase. Madagascar, which did not mine nickel in 2002, would have a 33% share of African nickel mine production in 2007. Increased capacity at the Nkomati Mine is likely to raise South Africa's output by 56% by 2007. Production is also expected to increase in Botswana and Zimbabwe (table 16). By 2007, Africa's share of world nickel mine output would rise to nearly 10%.

Platinum-Group Metals.—*Production.*—In 2002, Africa's production of rhodium, palladium, and platinum increased by 15%, 5%, and 4%, respectively. South Africa, which was the continent's dominant producer of PGM in Africa, accounted for 98% and 97% of the production of platinum and palladium, respectively (tables 17, 18). Africa's share of world platinum mine output was 74% in 2002 compared with 71% in 1995 and 62% in 1990. From 1990 to 2002, Africa's share of global palladium mine production rose to 40% from 27%. Africa's share of world palladium output was lower than its share of platinum output because South African deposits of PGM tend to have higher ratios of platinum to palladium than Russian deposits.

Outlook.—After rising by nearly 3% in 2003, African mine production of platinum is expected to increase by 1% per year from 2003 to 2007 (tables 17, 18). In South Africa, PGM production was expected to rise because of the openings of the Everest South, Marula, and Twickenham Mines and higher production from the Marikana Mine. Higher output in Zimbabwe is likely to result from the expansions of the Makwiro and Mimosa Mines and the development of the Unki Mine.

Silver.—*Production.*—In 2002, African mine production of silver rose by more than 5% compared with that of 2001. Although output decreased in Morocco, which was the largest

producer of silver in Africa, continental production rose because of higher output from Namibia, South Africa, and Tanzania. Namibia accounted for most of the increase; its output more than doubled because of higher production from the Rosh Pinah Mine. In South Africa, higher silver output from gold, lead, PGM, and zinc mines more than offset lower production from copper mines. Production fell in Tunisia and Zimbabwe. From 1990 to 2002, Morocco's share of continental output rose to 61% from 39%, and Namibia's share fell to 10% from 15%. Congo (Kinshasa), which had a share of 14% in 1990, has ceased silver mining (table 19). Africa's share of world silver mine production was about 2% in 2002.

Consumption.—In 2002, African consumption of silver fell by more than 6%. Africa's share of the world's silver consumption was less than 1%. Egypt accounted for nearly 50% of African silver consumption, and Morocco, nearly 20% (Silver Institute, 2003, p. 75-76).

Outlook.—The long-term decline in African silver production is likely to be reversed. After falling by about 3% in 2003, silver mine production is expected to rise by an average of 2% to 3% per year from 2003 to 2007. In Tanzania, production is expected to rise because of higher gold production at the Bulyanhulu Mine. Production is expected to rise in South Africa as gold, nickel, and PGM output increases. Output is also likely to restart in Congo (Kinshasa) and Zambia (table 19).

Tin.—*Production.*—In 2002, continental tin mine production fell by 2%. Production ceased in Burundi and Uganda. In Rwanda, output rose by nearly 17%; production also rose by 22% in Niger. In 1990, South Africa's share of continental tin production was 28%; Zimbabwe, 28%; Namibia, 22%; Rwanda, 13%; and Nigeria, 4%. By 2002, Nigeria and Rwanda accounted for 92% and 6%, respectively, of African tin mine output; mining had ceased in Namibia, South Africa, and Zimbabwe (table 20). Africa accounted for 1% of global tin mine production in 2002.

In August 2002, production started at the Metal Processing Association's (MPA) smelter in Rwanda. Since 1990, Congo (Kinshasa), South Africa, and Zimbabwe have ceased tin metal production (table 21). In 2002, Africa accounted for less than 1% of the world's refined tin metal output.

Consumption.—In 2002, continental consumption of tin metal rose sharply. Africa's share of the world's tin consumption was nearly 2%. In 2002, South Africa accounted for about three-fourths of Africa's tin demand (World Bureau of Metal Statistics, 2001, p. 122; 2003, p. 122).

Outlook.—The expansion by Régie d'Exploitation et de Développement des Mines is expected to raise Rwanda's mine production of tin to about 420 t by 2005 (table 20). MPA's smelter in Rwanda is expected to produce 200 t/yr (table 21). Africa's share of tin metal production is likely to remain below 1% until at least 2007.

Titanium.—*Production.*—The titanium dioxide (TiO₂) content of ilmenite produced in Africa remained nearly unchanged in 2002. South Africa accounted for 93% of regional output, and Egypt, 7% (table 26).

Outlook.—The TiO₂ content of African ilmenite production is expected to rise to 1.26 Mt in 2005 and 1.86 Mt in 2007. The

increase in South Africa's output would be attributable to the start of the Richards Bay project, which was a joint venture between Kumba Resources Ltd. and Ticor Ltd. of Australia. In 2005, Tiomin Resources Inc. planned to start the Kwale project, and Sierra Rutile Ltd. expected to reopen its mine in Sierra Leone. The Corridor Sands and Moma projects were likely to raise Mozambique's production to about 480,000 t of TiO₂ in 2007. Mozambique, which did not produce ilmenite in 2002, would account for 26% of African ilmenite production in 2007 (table 26).

In Madagascar, Rio Tinto plc has indicated that any development of its mineral sands project near Tolagnaro is unlikely before 2007. In Malawi, the Chipoka, Makanjira, and Salima projects may result in further increases in African ilmenite production, but whether these projects would be implemented by the end of 2007 is uncertain.

Tungsten.—Production.—In 2002, African production of tungsten in ore increased to 169 t from 159 t in 2001. Tungsten was produced exclusively in central African countries in 2002. Output increased in Rwanda and fell in Uganda because of a lack of infrastructure (table 22). Since 1990, Burundi, Congo (Kinshasa), and Zimbabwe have ceased tungsten mining. Africa accounted for less than 1% of global tungsten mine production in 2002.

Outlook.—The expansion by Régie d'Exploitation et de Développement des Mines is expected to raise Rwanda's production of tungsten to about 170 t. Uganda's production is expected to increase sharply because of higher output from the Nyamuliro deposit. Africa is likely to remain a minor producer of tungsten through at least 2007 in spite of higher production (table 22).

Zinc.—Production.—Africa's mine production of zinc rose by 1% in 2002. In South Africa, national production rose because of higher output from the Black Mountain Mine. Namibia's production increased because of higher output from the Rosh Pinah Mine. Lower production from the Bougrine Mine caused Tunisia's output to fall. Morocco accounted for 38% of African zinc mine production; South Africa, 27%; Namibia, 18%; and Tunisia, 15% (table 23). Africa's share of world zinc mine production was about 3% (table 4).

South Africa, which was the largest producer of zinc metal in Africa, accounted for 80% of continental output. In 2002, African production of zinc metal fell by 8%. In Algeria, production fell because of lower production by Société Algérienne du Zinc's refinery at Ghazaouet. Zinc Corp. of South Africa Ltd. decreased production at its Struisbult Springszinc refinery in 2002 (table 24).

Consumption.—In 2002, Africa's consumption of zinc slab rose by 9% compared with 2001 and 30% compared with 1997. Africa's share of the world's zinc slab consumption was about 2%. In 2002, South Africa accounted for about two-thirds of regional zinc slab consumption; Egypt, Kenya, and Nigeria accounted for most of the remainder (World Bureau of Metal Statistics, 2001, p. 130; 2003, p. 130, 142).

Outlook.—African zinc mine production is likely to rise to 264,000 t in 2003, 357,000 t in 2005, and 394,000 t in 2007. Most of the increase would be attributable to the Skorpion

Mine and smelter project in Namibia by 2004 and possibly the Kipushi Mine in Congo (Kinshasa) by 2007. In 2007, Namibia could account for 46% of African zinc mine production, and Congo (Kinshasa), 13%. In Morocco, which was Africa's leading producer of zinc ore, output is expected to rise by 26% by 2007. In South Africa, which was the continent's second leading producer, output is expected to fall by about 45% during the same period because of the closure of the Perring Mine in February 2003. The depletion of the Bougrine Mine in 2005 would cause Tunisia's share of African zinc mine production to fall to less than 1% (table 23).

New smelters in Namibia and possibly Congo (Kinshasa) could increase regional production of zinc metal to 334,000 t in 2007. Namibia, which did not produce zinc in 2001, could account for 45% of Africa's zinc metal output in 2007, and Congo (Kinshasa), 15% (table 24).

Industrial Minerals

Africa was a significant producer of several industrial minerals. In 2002, Botswana and South Africa were the world's first and third leading producers of diamond by value, respectively. Tanzania was the world's only producer of tanzanite. Kenya, Madagascar, and Zambia were leading producers of ruby, sapphire, and emerald, respectively. South Africa accounted for more than one-half of reported global vermiculite production. Morocco was the world's second leading producer of phosphate rock and the third leading producer of barite. Zimbabwe was the world's second leading producer of lithium minerals.

Africa's consumption of sulfuric acid was mostly for agricultural purposes; this use reflected the continent's low level of industrialization. In recent years, cement consumption increased substantially in such countries as Mozambique and Tanzania because of new projects in the minerals industry.

Diamond.—Production.—In 2002, Africa's share of world diamond production by volume was 52% compared with 46% in 1995 and 44% in 1990. The continent's diamond production increased by nearly 3% in 2002. Production rose in Botswana, Congo (Kinshasa), and Namibia and fell in Angola and South Africa (tables 4, 25).

In Botswana, increased production from the Jwaneng and Orapa Mines boosted national diamond output by 7%. Namibia's production rose because of higher production by Diaz Exploration (Pty) Ltd., Diamond Fields International Ltd., and Namibia Minerals Corp. Higher production by artisanal miners caused output in Congo (Kinshasa) to rise in 2002. South Africa's decrease in production was mostly attributable to lower output from the Finsch, Kimberley, Koffiefontein, and Namaqualand Mines. Botswana accounted for 42% of African diamond output by volume; Congo (Kinshasa), 28%; South Africa, 16%; and Angola, 7% (table 25).

In 2002, the global value of rough diamond production amounted to \$7.8 billion, of which Africa accounted for about two-thirds. Botswana accounted for nearly 32% of the value of global rough diamond output; South Africa, 11%; Angola, 10%; Congo (Kinshasa), 6%; and Namibia, 5%. In 2002, South Africa, which was Africa's leading producer of

polished diamond, produced about \$500 million of polished diamond from \$400 million of rough diamond. South Africa accounted for about 4% of the world value of polished diamond production.

In November 2001, the Kimberley Process established a certification system to reduce the trade of conflict diamonds, particularly from Angola, Congo (Kinshasa), and Sierra Leone. The Kimberley Process involved Government officials from more than 50 countries that produced, processed, and imported diamond; the European Union; the World Diamond Council; and nongovernmental organizations. In December 2002, the following African countries planned to implement the Kimberley Process in January 2003: Angola, Botswana, Burkina Faso, Central African Republic, Congo (Kinshasa), Côte d'Ivoire, Gabon, Ghana, Guinea, Lesotho, Mauritius, Namibia, Sierra Leone, South Africa, Swaziland, Tanzania, and Zimbabwe.

Outlook.—After falling by nearly 1% in 2003, the production of rough diamond is expected to rise by an average of 1% per year from 2003 to 2007. Production was likely to fall in Botswana and Congo (Kinshasa) and to rise in Angola and South Africa (table 25). In Angola, increasing output would be attributable to the expansion of the Catoca Mine and the reopening of the Camafuca-Camazba Mine. South Africa's production is likely to rise because of the opening of the Klipspringer Mine. By 2007, Namibia's diamond production would rise to nearly 2.5 million carats because of the expansion of Namdeb Diamond Corporation (Pty) Limited's operations (table 25). Other sources of higher production included the expansion of the Williamson Mine in Tanzania and the opening of the Koidu Mine in Sierra Leone. Africa's share of world diamond production was expected to fall to 48% in 2007.

Phosphate Rock.—*Production.*—In 2002, the phosphorous pentoxide (P_2O_5) content of African phosphate rock production rose to 12.9 Mt from 12.5 Mt in 2001. Output increased in Egypt, Morocco, South Africa, and Togo; the increase in Togo's production was attributable to the expansion of the Hahotie and Kpogame Mines. Production fell in Algeria and Tunisia. Morocco, which was the leading producer of phosphate rock in Africa, accounted for 60% of continental phosphate rock output. Tunisia's share of African production was 18%; South Africa, 7%; and Senegal, 5% (table 27). In 2002, Africa produced about 29% of world phosphate rock.

Outlook.—The P_2O_5 content of African phosphate rock production is expected to increase to 14.3 Mt in 2007. Togo's production is likely to nearly triple by 2007 because of the expansion of the Hahotie and Kpogame Mines; its share of African phosphate rock output would rise to 8% from less than 4%. Morocco is expected to account for most of the remaining increase in African production; planned expansions by Office Cherifien des Phosphates would increase Morocco's production by 9% by 2007. Production was also expected to rise in Algeria and Tunisia. South African production is expected to fall (table 27).

Mineral Fuels

Africa was a producer of mineral fuels; its share of world uranium production was nearly 20%. South Africa was a significant producer and exporter of bituminous coal. Most of Africa's natural gas production was in the northern part of the continent. Northern and western African countries were the most significant producers of crude petroleum. Niger was one of the world's leading producers of uranium. Africa's share of world mineral fuel consumption was modest.

Coal.—*Production.*—Regional coal production fell by nearly 2% in 2002. Most of the decrease was attributable to South Africa where higher production from the Kangwane, Klip River, Nongoma, and Waterburg Mines was more than offset by lower production from the Ermelo, Highveld, Soutpansberg, and Vryheid Mines. Output fell in Zambia and Zimbabwe and rose in Botswana and Niger; the fall in Zimbabwe's production was the result of foreign currency shortages, price controls, and problems with transportation. South Africa, which was the dominant coal producer in Africa, accounted for 97% of regional coal output; Zimbabwe, 2%; and others, 1% (table 28). More than 99% of South Africa's coal production was bituminous. Malawi was Africa's only producer of lignite coal; the Mwabi Mine opened in 2002. Africa accounted for about 5% of total world coal production in 2002 and less than 1% of world lignite coal production.

Consumption.—Africa accounted for nearly 4% of world coal consumption in 2002. Within the region, South Africa accounted for 90% of African coal consumption. From 1997 to 2002, Africa's consumption of coal fell by about 1.8% (British Petroleum plc, 2003, p. 33).

Outlook.—African production of anthracite and bituminous coal is expected to increase to 258 Mt in 2007. South Africa is likely to account for most of the region's increase in coal output; national production could reach 235 Mt in 2005 and 250 Mt in 2007 (table 28). Rising production would be partially attributable to the opening of the Kriel South Mine. The National Development Corporation of Tanzania planned to start production at Mchuchuma in 2006 or 2007. Production was expected to rise in Zimbabwe and to resume in Swaziland. Expansion plans were expected to raise lignite coal production at Mwabi to at least 200,000 t/yr. In Mozambique, the Moatize project could produce about 3 Mt/yr of coal. Implementation of this project by the end of 2007 is uncertain.

Natural Gas.—*Production.*—Regional production of dry natural gas increased by 7% in 2002. Nigeria and Egypt accounted for most of the increase in output; higher Egyptian production resulted from the development of the El Wastani, Rashid, and South Bilqas fields and the expansion of the Rosetta field. In 2002, Algeria accounted for 54% of Africa's dry natural gas output; Nigeria, 24%; and Egypt, 15%. Nigeria's share of continental dry natural gas output was 5% in 1990 (table 29). Africa accounted for about 7% of world natural gas production in 2002 compared with 4% in 1995.

Consumption.—The African continent consumed nearly 3% of the world's natural gas. Africa's consumption rose to 67.4 billion cubic meters in 2002 compared with 65.3 billion cubic meters in 2001 and 46.2 billion cubic meters in 1997. Algeria accounted for 39% of Africa's dry natural gas consumption; Egypt, 34%; and others, 27% (British Petroleum plc, 2003, p. 25).

Outlook.—After rising by about 3% in 2003, African production of dry natural gas is expected to rise by nearly 7% per year from 2003 to 2007 (table 29). Algeria's output of dry natural gas is likely to increase because of new production from Askarene Guelta, Dimeta West, Ohanet North, and Ohanet South that will start in 2003 and from Tiguentourine that will start in late 2005. Nigeria's production would be boosted by the development of the third phase of the Escravos gas project.

Egypt's production is expected to rise to 31 billion cubic meters in 2003 before falling to 29 billion cubic meters in 2005 and 2007. The development of the Sapphire, Sienna, and Simian fields and the expansion of the Rosetta field were expected to contribute to higher output. Libya's share of African natural gas production is likely to rise to 11% in 2007 from 3% in 2002. The opening of C Structure and Wafa is expected to contribute to rising production. In Angola, production of natural gas was expected to rise to 5.5 billion cubic meters in 2007. The Songo Songo project in Tanzania and the Temane project in Mozambique were expected to be commissioned in 2004 (table 29).

Petroleum.—*Production.*—In 2002, African crude petroleum production increased by 1%. Angola accounted for the majority of the increase; output also increased significantly in Algeria and Sudan. Nigerian output fell by 6%, which was partially the result of civil unrest and natural disasters. Production also fell modestly in Libya and Egypt. Nigeria accounted for 27% of regional crude petroleum production; Libya, 18%; Algeria, 18%; Angola, 12%; and Egypt, 10%. In 2002, Africa's share of world crude petroleum production amounted to 12% (tables 4, 30).

Consumption.—Regional consumption of petroleum products increased to 922 million barrels (Mbbbl) in 2002 from 906 Mbbbl in 2001 and 841 Mbbbl in 1997. Africa accounted for about 3% of world petroleum products consumption. Egypt accounted for 22% of African consumption of petroleum products; South Africa, 20%; Algeria, 9%; and others, 49% (British Petroleum plc, 2003, p. 9).

Outlook.—After rising by 21% in 2003, crude petroleum production is expected to rise by more than 6% per year from 2003 to 2007. Nigeria's output is likely to increase to 1.5 billion barrels in 2007. Sources of additional production would include the Abo, Agbami, Amenam/Kpono, Bonga, Bonga Southwest, and Erha fields. In Angola, production is expected to nearly double from development that is based on new deepwater discoveries in blocks 14, 15, 17, and 18. Nigeria's and Angola's shares of African crude petroleum production are expected to rise to 34% and 14%, respectively, by 2007. Sudan's share of continental output is expected to rise to 6% in 2007 from 2% in 2002 because of new production in blocks 3, 6, and 7. Production is also expected to rise substantially in Algeria and

Libya; sources of new Algerian output included blocks 208, 404, 405a, 406, and 406a. In Chad, the Doba oilfield was expected to reach full production by 2005 (table 30).

Uranium.—*Production.*—In 2002, African uranium output rose by 3% from that of 2001. Production increased in Namibia because of higher grades of ore from the Rossing Mine. Niger's production rose because of higher output by Société Minière de l'Air and Compagnie Minière d'Akouta. Uranium production fell in South Africa by 6%. Niger accounted for 49% of African uranium production; Namibia, 37%; and South Africa, 14%. In 1990, Niger's and South Africa's shares of continental production were 30% and 27%, respectively (table 31). Africa accounted for about 17% of the world's uranium production (table 4).

Consumption.—South Africa was the only regional consumer of uranium in 2002. Africa accounted for less than 1% of the electricity generated by nuclear power (International Atomic Energy Agency, 2003).

Outlook.—After showing little change in 2003, continental uranium mine production was expected to rise by nearly 5% by 2005 compared with that of 2002. Output was expected to remain nearly unchanged in South Africa. Higher production from the Rossing Mine was expected to boost Namibia's production to 2,700 t in 2007 (table 31). The present mine was due to be depleted in 2007; the profitability of the new pit extension at Rossing depended heavily upon favorable exchange rate conditions. Paladin Resources Ltd. of Australia was considering the development of the Kayelekera project in Malawi, which would produce about 850 t/yr of uranium. Whether this project would be implemented by the end of 2007 is uncertain. The International Atomic Energy Agency (2003) predicted that Africa's production of electricity from nuclear power would rise by 1% to 2% per year from 2002 to 2010.

Trade Review and Outlook

Africa's current account deficit rose to 1.3% of GDP in 2002 from 0.5% of GDP in 2001. In 2002, South Africa had a current account surplus of 0.3% of GDP, and other sub-Saharan countries ran an average deficit of 4.7% of GDP. Trade surpluses in oil-exporting countries were more than offset by trade deficits in oil-importing countries (International Monetary Fund, 2003, p. 51).

Oil-importing countries had an average current account deficit of 2% of GDP in 2002, which was a decrease from 2.7% of GDP in 2001. Oil-exporting countries ran an average current account surplus of 0.5% of GDP in 2002, which was a decrease from 5.3% of GDP in 2001. The average current account deficit for oil-importing countries is expected to increase to 2.6% of GDP in 2003 and to 2.7% of GDP in 2004. For oil-exporting countries, the surplus is predicted to rise to 4.9% of GDP in 2003 before falling to 2.5% of GDP in 2004. Africa is expected to run a current account deficit of 0.7% of GDP in 2003 and of 1.4% of GDP in 2004. An increase in gold and other metals prices would be more than offset by declining terms of trade for oil exporters (International Monetary Fund, 2003, p. 51).

In 2002, mineral fuels accounted for more than 90% of the export earnings of Algeria, Angola, Equatorial Guinea, Libya, and Nigeria. Minerals and mineral fuels accounted for more than 80% of the export earnings of Botswana (in order of importance, diamond, copper, nickel, and soda ash), Congo (Brazzaville) (petroleum), Congo (Kinshasa) (diamond, petroleum, cobalt, and copper), Guinea (bauxite, alumina, gold, and diamond), Gabon (petroleum and manganese), and Sudan (petroleum and gold). Minerals and mineral fuels accounted for more than 50% of the export earnings of Mali (gold), Mauritania (iron ore), Mozambique (aluminum and petroleum products), Namibia (diamond and uranium), and Zambia (copper and cobalt). Gold was also a significant source of export earnings in Ghana, South Africa, and Tanzania. Diamond was a significant source of export earnings in the Central African Republic, Namibia, Sierra Leone, and South Africa as was uranium in Niger.

Environment

Deforestation for fuel use and land-intensive agricultural production continues to be a significant environmental issue in many African countries. Other causes of deforestation included artisanal production of gemstones and lime. The West African Pipeline Project, which is expected to be completed in 2006, could help mitigate the effects of deforestation in Benin, Ghana, and Togo and reduce the emissions of greenhouse gases. Some of the natural gas that is currently (2002) being flared by Nigeria will be exported to Benin, Ghana, and Togo. The Government of Nigeria has committed to ending the flaring of natural gas by 2004, which will also lead to decreased pollution in Nigeria.

The use of mercury by artisanal gold miners has led to serious air and water pollution in such African countries as Ghana, Kenya, Mozambique, South Africa, Sudan, Tanzania, and Zimbabwe. The Global Environment Facility, the United Nations Development Program, and the United Nations Industrial Development Organization began the Global Mercury Project in August 2002 to alleviate these problems. The Global Mercury Project provides cleaner technologies and training to miners, conducts health assessments, and helps institute Government regulatory capacities.

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TABLE 1
AFRICA: 2002 AREAL EXTENT AND ESTIMATED POPULATION

Country	Area ¹ (square kilometers)	Estimated population ² (millions)
Algeria	2,382,740	31.3
Angola	1,246,700	13.9
Benin	112,620	6.6
Botswana	600,370	1.7
Burkina Faso	274,200	11.8
Burundi	27,830	7.1
Cameroon	475,400	15.5
Cape Verde	4,033	0.5
Central African Republic	622,984	3.8
Chad	1,284,000	8.1
Comoros	2,170	0.6
Congo (Brazzaville)	342,000 ³	3.2
Congo (Kinshasa)	2,345,410 ³	53.8
Côte d'Ivoire	322,460	16.8
Djibouti	23,000	0.7
Egypt	1,001,450	66.4
Equatorial Guinea	28,051	0.5
Eritrea	121,320	4.3
Ethiopia	1,127,127	67.3
Gabon	267,667	1.3
The Gambia	11,300	1.4
Ghana	239,460	20.1
Guinea	245,857	7.7
Guinea-Bissau	36,120	1.3
Kenya	582,650	31.3
Lesotho	30,355	2.1
Liberia	111,370	3.3
Libya	1,759,540	5.5
Madagascar	587,040	16.4
Malawi	118,480	10.7
Mali	1,240,000	11.3
Mauritania	1,030,700	2.8
Mauritius	2,040	1.2
Mayotte	374	0.1
Morocco	446,550	29.6
Mozambique	801,590	18.4
Namibia	825,418	1.8
Niger	1,267,000	11.5
Nigeria	923,768	132.8
Reunion	2,517	0.7 ¹
Rwanda	26,338	8.2
Sao Tome and Principe	1,001	0.2
Senegal	196,190	10
Seychelles	455	0.1
Sierra Leone	71,740	5.2
Somalia	637,657	9.4
South Africa	1,219,912	43.6
Sudan	2,505,810	32.4

See footnotes at end of table

TABLE 1--Continued
 AFRICA: 2002 AREAL EXTENT AND ESTIMATED POPULATION

Country	Area ¹ (square kilometers)	Estimated population ² (millions)
Swaziland	17,363	1.1
Tanzania	945,087	35.2
Togo	56,785	4.8
Tunisia	163,610	9.8
Uganda	236,040	23.4
Western Sahara	266,000	0.3 ¹
Zambia	752,614	10.5
Zimbabwe	390,580	13
Total	30,360,843	832.4
United States	9,269,091	288.4
World	NA	6,200

NA Not applicable.

¹Source: U.S. Central Intelligence Agency, World Factbook 2003.

²Source: World Bank Group, World Development Indicators, August 2003.

³Data revised on November 15, 2005.

TABLE 2
AFRICA: GROSS DOMESTIC PRODUCT (GDP) IN 2002¹

Country	Estimated GDP (PPP) ^{2,3} (billions)	Estimated GDP (PPP) per capita	Real GDP annual percentage change ^{2,4}
Algeria	\$169.1	\$5,400	4.1%
Angola	29.0	2,100	15.3%
Benin	10.5	1,600	6.0%
Botswana	17.2	10,100	2.6%
Burkina Faso	15.0	1,300	4.6%
Burundi	4.9	700	4.5%
Cameroon	36.9	2,400	6.5%
Cape Verde	1.8	3,600	4.6%
Central African Republic	6.0	1,600	0.8%
Chad	10.0	1,200	9.7%
Comoros	1.0	1,700	2.5%
Congo (Brazzaville)	6.0	1,900	3.0%
Congo (Kinshasa)	39.3	700	3.5%
Côte d'Ivoire	31.0	1,800	-1.8%
Djibouti	1.8	2,600	2.6%
Egypt	253.3	3,800	2.0%
Equatorial Guinea	5.0	10,000	13.3%
Eritrea	3.3 ⁵	800	1.8%
Ethiopia	41.4	600	1.2%
Gabon	9.5	7,300	0.0%
The Gambia	2.5	1,800	-3.1%
Ghana	40.5	2,000	4.5%
Guinea	17.5	2,300	4.2%
Guinea-Bissau	1.3	1,000	-7.2%
Kenya	39.7	1,300	1.0%
Lesotho	4.2	1,900	4.2%
Liberia	3.1 ⁵	900	2.0% ^{3,5}
Libya	83.0	15,100	1.2% ³
Madagascar	16.0	1,000	-12.7%
Malawi	8.8	800	1.8%
Mali	10.9	1,000	9.7%
Mauritania	5.8	2,100	3.3%
Mauritius	15.5	12,900	4.0%
Mayotte	0.1 ⁵	1,000	NA
Morocco	121.3	4,100	3.2%
Mozambique	20.7	1,100	8.3%
Namibia	10.8	6,000	2.7%
Niger	11.0	1,000	3.0%
Nigeria	127.3	1,000	0.5%
Reunion	4.2 ⁵	6,000	2.5% ^{3,5}
Rwanda	8.3	1,000	9.4%
Sao Tome and Principe	0.2	1,000	4.1%
Senegal	22.0	2,200	2.4%
Seychelles	0.8	8,000	0.3%
Sierra Leone	2.4	500	6.3%
Somalia	4.3 ⁵	500	3.5% ^{3,5}

See footnotes at end of table

TABLE 2--Continued
AFRICA: GROSS DOMESTIC PRODUCT (GDP) IN 2002¹

Country	Estimated GDP (PPP) ^{2,3} (billions)	Estimated GDP (PPP) per capita	Real GDP annual percentage change ^{2,4}
South Africa	\$376.1	\$8,600	3.0%
Sudan	\$70.4	\$2,200	5.0%
Swaziland	\$4.0	\$3,600	1.6%
Tanzania	\$24.2	\$700	6.3%
Togo	\$7.5	\$1,600	2.9%
Tunisia	\$65.8	\$6,700	1.7%
Uganda	\$34.5	\$1,500	6.6%
Western Sahara	NA	NA	NA
Zambia	\$11.4	\$1,100	3.0%
Zimbabwe	\$23.6	\$1,800	-12.8%
Total	\$1,891.7	\$1,800	3.1% ⁶
United States	\$10,225.1	\$35,500	2.4%
World	\$48,443.0	\$7,800	3.0%

NA Not available

¹Gross domestic product (GDP) based on purchasing-power-parity (PPP) valuation of country GDP.

²Source: International Monetary Fund, World Economic Outlook Database, September 2003.

³Table data compiled February 11, 2004; may be different than what is presented in previously written individual country chapters.

⁴Compared with 2001.

⁵Source: U.S. Central Intelligence Agency, World Factbook 2003.

⁶Does not include Egypt, Libya, Liberia, Reunion, and Somalia.

TABLE 3
SELECTED SIGNIFICANT AFRICAN EXPLORATION SITES IN 2002

Location	Type ¹	Site	Commodity ²	Company	Resource ^{2,3}	Exploration ⁴
Botswana	F	Mupane	Au	Gallery Gold Ltd.	795 koz Au	Extensive drilling.
Burkina Faso	F	Kalkasa	Au	Cluff Mining plc	470 koz Au	Do.
Congo (Kinshasa)	P	Lonshi	Cu	First Quantum Minerals Ltd.	356 kt Cu	Do.
Côte d'Ivoire	E	Bonikro	Au	Equigold NL	1.3 Moz Au	Do.
Egypt	F	Sukari	Au	Centamin Egypt Ltd.	1.74 Moz Au	Feasibility drilling.
Ghana	F	Chirano	Au	Red Back Mining NL	1.06 Moz Au	Do.
Guinea	P	Lero area	Au	Kenor ASA	2.94 Moz Au	Extensive drilling.
Mali	P	Sadiola	Au	Iamgold Corp.	5.1 Moz Au	Do.
Do.	F	Segala/Takakoto	Au	Nevsun Resources Ltd.	1.15 Moz Au	Do.
South Africa	F	Blue Ridge	PGM, Au	Cluff Mining plc	4.6 Moz PGM+Au	Feasibility drilling.
Do.	P	Platreef area	PGM, Au	Anooraq Resources Corp.	4.1 Moz PGM+Au	Extensive drilling.
Do.	E	Sheba's Ridge	PGM, Au	Cluff Mining plc	17.4 Moz PGM+Au	Do.
Tanzania	E	Buckreef/Rwamagaza	Au	Spinifex Gold Ltd.	Data not reported.	Extensive drilling.
Do.	E	Tulakawa	Au	Barrick Gold Corp.	965 koz Au	Do.
Zambia	F	Kansanshi	Cu, Au	First Quantum Minerals Ltd.	3.5 Mt Cu, 1.64 Moz Au	Feasibility drilling.
Do.	F	Lumwana	Cu, Co, Au	Equinox Resources Ltd.	6.3 Mt Cu, 89 kt Co, 289 koz Au	Do.

¹D--Approved for development; E--Active exploration; F--Feasibility work ongoing/completed; P--Exploration at producing site.

²Abbreviations used in this table for commodities include the following: Au--gold; Co--cobalt; Cu--copper; PGM--platinum-group metals. Abbreviations used in this table for units of measurement include the following: koz--thousand troy ounces; kt--thousand metric tons; Moz--million troy ounces; Mt--million metric tons.

³Resources reported where available based on data from various public sources. Values may have been updated and may differ from previously published data.

TABLE 4
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2002¹
(Thousand metric tons unless otherwise specified)

Country	Metals										
	Aluminum		Chromite, mine output, gross weight	Cobalt, mine output, Co content, (metric tons)	Copper, mine output, Cu content,	Gold, mine output (kilograms)	Iron and steel		Lead, mine output, Pb content		
	Bauxite	Metal ²					Iron ore, gross weight	Steel, crude			
Algeria	--	--	--	--	--	369	1,202	1,090	1		
Angola	--	--	--	--	--	--	--	--	--		
Benin	--	--	--	--	--	20 ^e	--	--	--		
Botswana	--	--	--	--	21	8	--	--	--		
Burkina Faso	--	--	--	--	--	390	--	--	--		
Burundi	--	--	--	--	--	483	--	--	--		
Cameroon	--	80 ^e	--	--	--	1,000 ^e	--	--	--		
Cape Verde	--	--	--	--	--	--	--	--	--		
Central African Republic	--	--	--	--	--	20 ^e	--	--	--		
Chad	--	--	--	--	--	150	--	--	--		
Comoros	--	--	--	--	--	--	--	--	--		
Congo (Brazzaville)	--	--	--	--	--	10 ^e	--	--	--		
Congo (Kinshasa)	--	--	--	12,500 ^e	32	20 ^e	--	80 ^e	--		
Côte d'Ivoire	--	--	--	--	--	2,000 ^e	--	--	--		
Djibouti	--	--	--	--	--	--	--	--	--		
Egypt	--	190	--	--	--	--	2,300	4,358	--		
Equatorial Guinea	--	--	--	--	--	500 ^e	--	--	--		
Eritrea	--	--	--	--	--	--	--	--	--		
Ethiopia	--	--	--	--	--	5,300 ^e	--	--	--		
Gabon	--	--	--	--	--	70 ^e	--	--	--		
Gambia, The	--	--	--	--	--	--	--	--	--		
Ghana	684	117	--	--	--	69,707	--	--	--		
Guinea	15,300	--	--	--	--	16,666	--	--	--		
Guinea-Bissau	--	--	--	--	--	--	--	--	--		
Kenya	--	2	--	--	--	1,477	1	--	--		
Lesotho	--	--	--	--	--	--	--	--	--		
Liberia	--	--	--	--	--	500	--	--	--		
Libya	--	--	--	--	--	--	--	886	--		
Madagascar	--	--	16	--	--	--	--	--	--		
Malawi	--	--	--	--	--	--	--	--	--		
Mali	--	--	--	--	--	56,026	--	--	--		
Mauritania	--	--	--	--	--	1,000	9,553	5	--		
Mauritius	--	--	--	--	--	--	--	--	--		
Morocco and Western Sahara	--	--	--	1,300	6	2,746	2	5	75		
Mozambique	9	273	--	--	--	--	--	--	--		

See footnotes at end of table.

TABLE 4--Continued
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2002¹

(Thousand metric tons unless otherwise specified)

Country	Metals										
	Aluminum		Chromite, mine output, gross weight	Cobalt, mine output, Co content, (metric tons)	Copper, mine output, Cu content,	Gold, mine output (kilograms)	Iron ore, gross weight		Iron and steel		Lead, mine output, Pb content
	Bauxite	Metal ²					Steel, crude	Steel, crude			
Namibia	--	--	--	--	18	2,644	--	--	--	--	14
Niger	--	--	--	--	--	28	--	--	--	--	--
Nigeria	--	--	--	--	--	40	25	--	--	--	(3)
Reunion	--	--	--	--	--	--	--	--	--	--	--
Rwanda	--	--	--	--	--	10 ^e	--	--	--	--	--
Sao Tome and Principe	--	--	--	--	--	--	--	--	--	--	--
Senegal	--	--	--	--	--	600 ^e	--	--	--	--	--
Seychelles	--	--	--	--	--	--	--	--	--	--	--
Sierra Leone	--	--	--	--	--	30 ^e	--	--	--	--	--
Somalia	--	--	--	--	--	--	--	--	--	--	--
South Africa	--	707	6,436	540 ^e	130	398,300	36,484	9,100	--	--	49
Sudan	--	--	14	--	--	6,000	--	--	--	--	--
Swaziland	--	--	--	--	--	--	--	--	--	--	--
Tanzania	--	--	--	--	3	37,000	--	--	--	--	--
Togo	--	--	--	--	--	--	--	--	--	--	--
Tunisia	--	--	--	--	--	--	198	220 ^e	--	--	5
Uganda	--	--	--	450 ^e	--	3	--	7	--	--	--
Zambia	--	--	--	10,000 ^e	330	--	--	--	--	--	--
Zimbabwe	--	--	749	87	3	15,469	272	105	--	--	--
Total ³	16,000	1,370	7,220	24,877	543	619,000	50,037	15,900	144	--	144
Share of world total	11.3%	4.4%	53.3%	47.2%	4.0%	24.1%	4.6%	1.8%	4.9%	--	4.9%
United States	NA	2,710	--	--	1,140	298,000	51,600	91,600	451	--	451
Share of world total	NA	8.7%	--	--	6.0%	11.7%	4.8%	10.6%	15.4%	--	15.4%
World total	141,000	31,100	13,500	52,700	13,700	2,570,000	1,080,000	865,000	2,930	--	2,930

See footnotes at end of table.

TABLE 4--Continued
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2002¹

(Thousand metric tons unless otherwise specified)

Country	Metals--Continued		Industrial minerals				Mineral fuels		
	Manganese ore, mine output, Mn content	Zinc, mine output, Zn content	Cement, hydraulic	Diamond, natural (thousand carats) ⁴	Graphite (metric tons)	Phosphate rock, gross weight	Coal, anthracite and bituminous	Petroleum, crude (thousand 42-gallon barrels)	Uranium, U ₃ O ₈ content (metric tons)
Algeria	--	8,576	9,000 ^e	--	--	740	--	499,890	--
Angola	--	--	350 ^e	5,022 ^{5,6}	--	--	--	329,600	--
Benin	--	--	250 ^e	--	--	--	--	--	--
Botswana	--	--	--	28,397 ⁷	--	--	953	--	--
Burkina Faso	--	--	30 ^e	--	--	2	--	--	--
Burundi	--	--	--	--	--	--	--	--	--
Cameroon	--	--	950 ^e	--	--	--	--	28,000 ^e	--
Cape Verde	--	--	--	--	--	--	--	--	--
Central African Republic	--	--	--	415	--	--	--	--	--
Chad	--	--	--	--	--	--	--	--	--
Comoros	--	--	--	--	--	--	--	--	--
Congo (Brazzaville)	--	--	--	--	--	--	--	94,170	--
Congo (Kinshasa)	--	--	190 ^e	18,556	--	--	1 ^e	8,500 ^e	--
Côte d'Ivoire	--	--	650 ^e	307	--	--	--	18,000 ^e	--
Djibouti	--	--	--	--	--	--	--	--	--
Egypt	8 ^e	--	23,000 ^e	--	--	1,500	400 ^e	274,000 ^e	--
Equatorial Guinea	--	--	--	--	--	--	--	69,000 ^e	--
Eritrea	--	--	45 ^e	--	--	--	--	--	--
Ethiopia	--	--	1,000	--	--	--	--	--	--
Gabon	767	--	210 ^e	1 ^e	--	--	--	108,000 ^e	--
Gambia, The	--	--	--	--	--	--	--	--	--
Ghana	363	--	1,900	963	--	--	--	3,300 ^e	--
Guinea	--	--	360	491	--	--	--	--	--
Guinea-Bissau	--	--	--	--	--	--	--	--	--
Kenya	--	--	1,229	--	--	--	--	--	--
Lesotho	--	--	--	1 ^e	--	--	--	--	--
Liberia	--	--	140	80	--	--	--	--	--
Libya	--	--	3,300	--	--	--	--	502,000 ^e	--
Madagascar	--	--	33	--	1,300 ^e	--	--	--	--
Malawi	--	--	174	--	--	--	42	--	--
Mali	--	--	--	--	--	--	--	--	--
Mauritania	--	--	200 ^e	--	--	--	--	--	--
Mauritius	--	--	--	--	--	--	--	--	--
Morocco and Western Sahara	9	91,000	10,200	--	--	23,041	(3)	91 ^e	--
Mozambique	--	--	274	--	--	--	44	--	--

See footnotes at end of table.

TABLE 4--Continued
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2002¹

(Thousand metric tons unless otherwise specified)

Country	Metals--Continued			Industrial minerals				Mineral fuels		
	Manganese ore, mine output, Mn content	Zinc, mine output, Zn content (metric tons)	Cement, hydraulic	Diamond, natural (thousand carats) ⁴	Graphite (metric tons)	Phosphate rock, gross weight	Coal, anthracite and bituminous	Petroleum, crude (thousand 42-gallon barrels)	Uranium, U ₃ O ₈ content (metric tons)	
Namibia	--	42,685	--	1,562	--	--	--	--	2,751	
Niger	--	--	40 ^e	--	--	--	183	--	3,628	
Nigeria	--	--	2,100	--	--	--	11 ^e	773,000 ^e	--	
Reunion	--	--	400 ^e	--	--	--	--	--	--	
Rwanda	--	--	83	--	--	--	--	--	--	
Sao Tome and Principe	--	--	--	--	--	--	--	--	--	
Senegal	--	--	2,150	--	--	2,004	--	--	--	
Seychelles	--	--	--	--	--	--	--	--	--	
Sierra Leone	--	--	120	352	--	--	--	--	--	
Somalia	--	--	--	--	--	--	--	--	--	
South Africa	1,504	64,173	--	10,876	--	2,803	220,200	4,899	998	
Sudan	--	--	190	--	--	--	--	87,759	--	
Swaziland	--	--	--	--	--	--	313	--	--	
Tanzania	--	--	1,026	213	--	26	79	--	--	
Togo	--	--	800 ^e	--	--	1,281	--	--	--	
Tunisia	--	35,692	6,022	--	--	7,735	--	26,800	--	
Uganda	--	--	262	--	--	--	--	--	--	
Zambia	--	--	230	--	--	--	64	--	--	
Zimbabwe	--	--	600 ^e	--	9,912	108	3,721	--	--	
Total ³	2,650	242,000	68,000	11,212	11,200	39,200	226,000	2,830,000	7,740	
Share of world total	31.6%	2.9%	3.8%	51.7%	0.8%	29.3%	6.2%	10.5%	16.7%	
United States	--	780,000	91,300	--	--	36,100	917,000	2,100,000	1,080	
Share of world total	--	9.3%	5.2%	--	--	26.9%	25.0%	7.7%	2.4%	
World total	8,390	8,380,000	1,770,000	130,000	1,330,000	134,000	3,670,000	27,100,000	45,200	

^eEstimated; estimated data, U.S. data, and world totals are rounded to no more than three significant digits; may not add to totals shown. NA Not available. -- Zero.

¹Table includes data available as of September 2004.

³Less than one-half unit.

⁴Gemstones and industrial diamond.

⁵Did not include smuggled production.

⁶Production was approximately 90% gem and 10% industrial grade.

⁷Assumed to contain about 70% gem and near gem.

TABLE 5
AFRICA: HISTORIC AND PROJECTED BAUXITE PRODUCTION, 1990-2007¹

(Thousand metric tons)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Ghana	381	513	504	678 ^r	684 ^r	800	1,000	1,000
Guinea	15,800	15,800	15,700	15,100 ^r	15,300 ^r	15,300 ^r	16,300 ^r	16,300 ^r
Mozambique	7	11	8	9	9	9	10	10
Sierra Leone	1,430	--	--	--	--	--	--	--
Undistributed	--	--	--	--	--	10	10	10
Total	17,600	16,300	16,200	15,800 ^r	16,000 ^r	16,100 ^r	17,300 ^r	17,300 ^r

^eEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 6
AFRICA: HISTORIC AND PROJECTED ALUMINUM PRODUCTION, 1990-2007¹

(Thousand metric tons)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Cameroon	93	79	86	81	80	90	90	90
Egypt	179	180	193	191 ^r	195	210 ^r	210 ^r	210 ^r
Ghana	174	135	137 ^r	144 ^r	117 ^r	40 ^r	--	100
Kenya ²	--	2	2	2	2	2	2	2
Mozambique	--	--	54	266	273 ^r	405 ^r	510 ^r	510 ^r
Nigeria	--	--	--	--	--	--	50 ^r	190
South Africa	159	229	673 ^r	662 ^r	707 ^r	675	825	825
Total	605	625	1,150	1,350 ^r	1,370 ^r	1,420 ^r	1,690 ^r	1,930 ^r

^eEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Kenya produced secondary refined aluminum; primary production in all other African countries.

TABLE 7
AFRICA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 1990-2007¹

(Metal content in thousand metric tons)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Botswana	25	25	22	20	21 ^r	20	18	18
Congo (Kinshasa)	509	29	21	21	32 ^r	60 ^r	90 ^r	130
Morocco	16	14	7	6	6	6	6	6
Namibia	28	23	6 ^r	12 ^r	18 ^r	25	25	25
South Africa	179	166	137	142 ^r	130 ^r	123 ^r	123	113
Tanzania	--	--	--	3	3 ^r	3	3	3
Zambia	519	316	249	312	330 ^r	360	420	710 ^r
Zimbabwe	14	9	2	2	3 ^r	2	--	--
Total	1,290	582	444 ^r	518 ^r	543 ^r	599 ^r	685 ^r	1,010 ^r

^eEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 8
AFRICA: HISTORIC AND PROJECTED REFINED COPPER PRODUCTION, 1990-2007¹

(Thousand metric tons)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^e
Congo (Kinshasa)	339	35	31 ^r	38 ^r	30 ^r	20 ^r	20 ^r	50 ^r
Egypt ²	4	4	5	5	5	5	5	5
South Africa	133	124	126	132	101 ^r	110 ^r	110 ^r	100 ^r
Zambia	438	328	227	296	337 ^r	320	420	700 ^r
Zimbabwe	14	7	10	2	2 ^r	2 ^r	-- ^r	-- ^r
Total	928	498	399 ^r	473 ^r	475 ^r	460 ^r	560 ^r	860 ^r

^cEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Egypt produced secondary refined copper; primary production in all other African countries.

TABLE 9
AFRICA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 1990-2007¹

(Metal content in kilograms)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Algeria	--	--	--	300	369	(²)	(²)	(²)
Benin	--	300	-- ^r	16 ^r	20	(²)	(²)	(²)
Botswana	46	86	4	2	8	(²)	(²)	(²)
Burkina Faso	7,800	1,319	553 ^r	209 ^r	390	400	1,200	3,500
Burundi	9	2,000	--	415	483	500	500	500
Cameroon	10	800	1,000	1,000	1,000	(²)	(²)	(²)
Central African Republic	241	97	12	20	20	(²)	(²)	(²)
Chad	--	--	120	150	150	(²)	(²)	(²)
Congo (Brazzaville)	7	10	10	10	10	(²)	(²)	(²)
Congo (Kinshasa)	9,300	1,180	69 ^r	19 ^r	20 ^r	(²)	(²)	(²)
Côte d'Ivoire	20	1,983	3,154	3,100	2,000 ^r	3,000	3,000	3,000
Equatorial Guinea	50	50	500	500	500	(²)	(²)	(²)
Eritrea	--	59	264	107 ^r	--	--	--	--
Ethiopia	848	4,500	5,177	5,200	5,300	5,300	5,300	5,300
Gabon	80	70	70	70	70	(²)	(²)	(²)
Ghana	16,800	53,087	72,080	68,699	69,707 ^r	69,800	59,600 ^r	84,600 ^r
Guinea	6,340	7,863	13,104	16,264 ^r	16,666 ^r	16,000	14,900	25,200
Kenya	25	170	1,243	1,545	1,477	1,500	1,500	1,500
Liberia	600	800	1,000	1,000	500	400	700	1,000
Madagascar	216	38	5	--	--	--	--	--
Mali	5,200	3,996	28,717	42,288	56,026 ^r	45,500 ^r	46,400 ^r	49,700 ^r
Mauritania	--	1,196	1,000	1,000	1,000	1,000	1,000	4,100 ^r
Morocco	500	580	505	1,191 ^r	2,746 ^r	3,000	3,000	3,000
Mozambique	63	6,800	23	22 ^r	17	20	20	20
Namibia	1,610	2,394	2,417	2,706 ^r	2,644 ^r	2,600 ^r	2,600 ^r	2,600 ^r
Niger	--	1,000	25 ^r	30 ^r	28	30	4,000	3,100
Nigeria	--	5	52 ^r	37 ^r	40	(²)	(²)	(²)
Rwanda	2,160	26	10	10	10	10	10	10
Senegal	--	--	550	550	600	600	600	600
Sierra Leone	32	4	30	30	30	(²)	(²)	(²)
South Africa	605,000	523,809	430,800 ^r	394,800 ^r	398,300 ^r	378,000 ^r	420,000 ^r	450,000 ^r
Sudan	100	3,700	5,774 ^r	5,417 ^r	6,000 ^r	5,000	4,000	--
Tanzania	3,500	320	15,060	30,088	37,000	45,600	53,900	56,600
Uganda	--	1,506	56	--	3	(²)	(²)	(²)
Zambia	129	91	600	-- ^r	--	-- ^r	-- ^r	-- ^r
Zimbabwe	16,900	23,959	22,069	18,050	15,469 ^r	11,500	10,000	10,000
Undistributed	--	--	--	--	--	2,300	2,300	2,500
Total	678,000	644,000	606,000 ^r	595,000 ^r	619,000 ^r	592,000 ^r	635,000 ^r	710,000 ^r

^cEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Included in "Undistributed."

TABLE 10
AFRICA: HISTORIC AND PROJECTED IRON ORE MINE PRODUCTION, 1990-2007¹

(Thousand metric tons Fe content)

Country	Average grade ²	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Algeria	36%	1,470	1,100	820	750	750	750	750	750
Egypt		1,330	1,120	1,380	1,380	1,380	1,380	1,380	1,380
Liberia	57% to 64%	2,490	--	--	--	--	--	--	--
Mauritania	59% to 72%	6,800	7,000	7,500	6,700	6,200 ^r	7,300 ^r	7,300 ^r	7,900 ^r
Morocco		90	32	4	4	1	(³)	(³)	(³)
Nigeria	36%	138	62	--	--	--	(³)	(³)	(³)
South Africa		19,800	19,800	21,570	22,240	23,200 ^r	23,000 ^r	23,600	23,600
Tanzania	32%	--	14	--	--	--	--	--	--
Tunisia	54%	154	122	98	109	105	(³)	(³)	(³)
Uganda	61% to 67%	--	--	3	1	--	--	--	--
Zimbabwe		730	160	225	180	136 ^r	(³)	(³)	(³)
Undistributed		--	--	--	--	--	200 ^r	150 ^r	300 ^r
Total		33,000 ^r	29,400	31,600	31,400	31,800	32,600 ^r	33,200 ^r	33,900 ^r

^eEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Direct shipping ore and concentrate.

³Included in "Undistributed."

TABLE 11
AFRICA: HISTORIC AND PROJECTED IRON PRODUCTION, 1990-2007¹

(Thousand metric tons)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Algeria	1,046	940	1,100	1,250	1,250	1,300	1,300	1,300
Egypt:								
Pig iron	1,100	1,062	1,400	1,400	1,400	1,400	1,400	1,400
Direct-reduced iron	710	850	1,530	2,370	2,530	2,600	2,600	2,600
Libya	500	963	1,500	1,090	1,170	1,200	1,200	1,200
Mozambique	--	--	--	--	--	--	--	90
Morocco	15	15	15	15	15	(³)	(³)	(³)
South Africa:								
Pig iron	6,893	6,055	6,300	5,800	5,800	6,000	6,500	6,500
Direct-reduced iron	1,067	1,262	1,530	1,560	1,700	1,700	1,700	1,700
Tunisia	140	162	196	192	152	(³)	(³)	(³)
Zimbabwe	521	209	277 ^r	156 ^r	122 ^r	(³)	(³)	(³)
Undistributed	--	--	--	--	--	200	200	350
Total	12,000	11,500	13,800	13,800	14,100	14,400	14,900	15,100

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Included in "Undistributed."

TABLE 12
AFRICA: HISTORIC AND PROJECTED STEEL PRODUCTION, 1990-2007¹

(Thousand metric tons)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Algeria	836	827	842	850	1,090 ^r	800	900	900
Angola	10	--	--	--	--	--	--	--
Benin	8	--	--	--	--	--	--	--
Congo (Kinshasa)	NA	NA	159	80	80	(^o)	(^o)	(^o)
Egypt	2,240	2,642	2,820	3,800	4,358 ^r	4,000	4,000	4,000
Kenya	20	20	--	--	--	--	--	--
Libya	492	909	1,055	846	886	1,000	1,300	1,300
Mauritania	NA	NA	5	5	5	(^o)	(^o)	(^o)
Morocco	7	7	5	5	5	(^o)	(^o)	(^o)
Nigeria	220	36	--	--	--	(^o)	(^o)	(^o)
South Africa	8,620	8,741	8,481	8,821	9,100 ^r	9,000	9,000	9,000
Tunisia	177	201	237	239	220	(^o)	(^o)	(^o)
Uganda	--	12	7	7	7	(^o)	(^o)	(^o)
Zimbabwe	580	210	258	149	105 ^r	(^o)	(^o)	(^o)
Undistributed	--	--	--	--	--	350 ^r	400 ^r	1,300
Total	13,200	13,600	13,900	14,800	15,900	15,200	15,600	16,500

^eEstimated. ^rRevised. -- Negligible or no production. NA Not available.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Included in "Undistributed."

TABLE 13
AFRICA: HISTORIC AND PROJECTED LEAD MINE PRODUCTION, 1990-2007¹

(Metal content in metric tons)

Country ²	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Algeria	1,100	1,383	818	891	1,105 ^r	900	900	900
Morocco	68,800	67,708	81,208	76,747	75,000 ^r	85,000	90,000	90,000
Namibia	18,000	16,084	11,114	12,088	13,809 ^r	15,800	15,800	20,000
South Africa	69,400	88,449	75,262	50,771	49,444 ^r	50,000 ^r	50,000 ^r	50,000 ^r
Tunisia	2,970	6,601	6,602	6,820	5,081 ^r	4,600 ^r	3,000 ^r	1,000 ^r
Total	160,000	180,000	175,000	147,000	144,000 ^r	156,000 ^r	160,000 ^r	160,000 ^r

^eEstimated. ^rRevised.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Nigeria also mined small amounts of lead.

TABLE 14
AFRICA: HISTORIC AND PROJECTED PRIMARY REFINED LEAD PRODUCTION, 1990-2007¹

(Metric tons)

Country ²	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Algeria	1,000	800	6,100	6,000	6,000	6,000	6,000	6,000
Morocco	64,000	59,673	66,812	58,178	71,840	60,000	60,000	60,000
Namibia	35,100	26,752	--	--	--	--	--	--
Total	100,000	87,200	72,900	64,200	77,800	66,000	66,000	66,000

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Nigeria also refines a small quantity of primary lead.

TABLE 15
AFRICA: HISTORIC AND PROJECTED SECONDARY REFINED LEAD PRODUCTION, 1990-2007¹

(Metric tons)

Country ²	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Algeria	3,500	7,500	--	--	--	--	--	--
Kenya	2,400	2,000	1,000	1,000	1,000	1,000	1,000	1,000
Morocco	2,000	2,600	3,000	3,000	3,000	3,000	3,000	3,000
Nigeria	--	4,000 ^r	5,000	5,000	5,000	1,000 ^r	1,000 ^r	1,000 ^r
South Africa	31,200	32,100	46,200	53,000	50,000	50,000	50,000	50,000
Total	39,100	48,200 ^r	55,200	62,000	59,000	55,000 ^r	55,000 ^r	55,000 ^r

^cEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Egypt and Uganda also refine small quantities of secondary lead.

TABLE 16
AFRICA: HISTORIC AND PROJECTED NICKEL MINE PRODUCTION, 1990-2007¹

(Metal content in metric tons)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Botswana	23,200	18,088	20,286	18,585	20,005	25,000	25,000	28,000
Madagascar	--	--	--	--	--	--	--	50,000
South Africa	29,000	30,700	36,616	36,443	38,500	36,000	40,000	60,000
Zimbabwe	13,500	11,721	8,160	10,120	8,092	9,500	10,900	11,900
Total	65,700	60,500	65,000	65,100	66,600	70,500 ^r	76,000 ^r	150,000 ^r

^cEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 17
AFRICA: HISTORIC AND PROJECTED PLATINUM MINE PRODUCTION, 1990-2007¹

(Metal content in kilograms)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Ethiopia	2	(²)	(²)	(²)	(²)	(²)	(²)	(²)
South Africa	87,800	102,300	114,459	130,307	133,796	135,000	138,000	140,000
Zimbabwe	21	7	505	519	2,306	4,400	4,800	5,000
Total	87,800	102,000	115,000	131,000	136,000	139,000	143,000	145,000

^cEstimated.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Small amounts of platinum were produced, but information is insufficient to make estimates of production.

TABLE 18
AFRICA: HISTORIC AND PROJECTED PALLADIUM MINE PRODUCTION, 1990-2007¹

(Metal content in kilograms)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
South Africa	38,300	51,000	55,818	62,601	64,244	64,800	66,200	67,200
Zimbabwe	31	17	366	371	1,943	3,170	3,460	3,600
Total	38,300	51,000	56,200	63,000	66,200	68,000	69,700	70,800

^cEstimated.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 19
AFRICA: HISTORIC AND PROJECTED SILVER MINE PRODUCTION, 1990-2007¹

(Metal content in kilograms)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Algeria	2,500	2,000	1,400	1,700	1,700	1,700	1,700	1,700
Congo (Kinshasa)	84,000	900	--	--	--	--	--	5,000
Ethiopia	NA	NA	1,018	1,051	1,100	1,100	1,100	1,100
Ghana	840	2,660	6,101	1,945	2,129 ^r	3,500	3,400	3,800
Mali	270	250	--	--	--	--	--	--
Morocco	241,000	204,000	289,000	280,000	276,789 ^r	290,000	300,000	300,000
Namibia	92,100	69,000	9,287	20,396	43,632 ^r	13,000	14,000	15,000
South Africa	161,000	174,279	144,143	109,570	113,266 ^r	110,000	123,000	132,000
Tanzania	--	--	1,384	6,861	8,620 ^r	7,700 ^r	9,400 ^r	10,900
Tunisia	930	4,000	3,700	3,650	3,000 ^r	3,700	3,700	3,700
Zambia	17,000	8,676	4,710	--	-- ^r	6,300	9,100	10,800
Zimbabwe	21,200	15,640	3,799	3,449	1,711 ^r	2,800	2,300	2,300
Total	621,000	481,000	465,000	429,000	452,000 ^r	440,000	470,000 ^r	490,000 ^r

^cEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 20
AFRICA: HISTORIC AND PROJECTED TIN MINE PRODUCTION, 1990-2007¹

(Metal content in metric tons)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Burundi	54	15	7	4	--	-- ^r	-- ^r	-- ^r
Cameroon	3	2	--	--	--	--	--	--
Congo (Kinshasa)	100	--	50	50	50	--	--	20
Namibia	900	--	--	--	--	--	--	--
Niger	38	20	22	9	11	20	20	20
Nigeria	145	250	2,760	2,870	2,800	150	200	200
Rwanda	510	242	276	169	197	220	420 ^r	420 ^r
Tanzania	15	3	--	--	--	--	--	--
South Africa	1,140	--	--	--	--	--	--	--
Uganda	25	43	--	18	--	--	--	--
Zambia	1	--	--	--	--	--	--	--
Zimbabwe	1,120	10	1	--	--	--	--	--
Total	4,050	585	3,120	3,120	3,060	390 ^r	640 ^r	660 ^r

^cEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 21
AFRICA: HISTORIC AND PROJECTED TIN METAL PRODUCTION, 1990-2007¹

(Metric tons)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Congo (Kinshasa)	90	--	--	--	--	--	--	--
Nigeria	130	259	25	25	25	25	30	30
Rwanda	--	--	--	--	80	200	200	200
South Africa	1,210	--	--	--	--	--	--	--
Zimbabwe	838	--	--	--	--	--	--	--
Total	2,270 ^r	259	25	25	105	225	230	230

^eEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 22
AFRICA: HISTORIC AND PROJECTED TUNGSTEN MINE PRODUCTION, 1990-2007¹

(Metal content in metric tons)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Burundi	--	22	--	--	--	--	--	--
Congo (Kinshasa)	17	--	--	--	--	--	--	--
Rwanda	84	47	108	142	153 ^r	150	170 ^r	170 ^r
Uganda	4	17	--	17	16 ^r	10 ^r	120 ^r	120 ^r
Zimbabwe	1	--	--	--	--	--	--	--
Total	106 ^r	86	108	159	169 ^r	160 ^r	290 ^r	290 ^r

^eEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 23
AFRICA: HISTORIC AND PROJECTED ZINC MINE PRODUCTION, 1990-2007¹

(Metal content in metric tons)

Country ²	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Algeria	4,160	7,174	10,452	10,693	8,576 ^r	12,000	12,000	12,000
Congo (Kinshasa)	61,800	4,500	--	1,014	-- ^r	1,000	--	50,000
Morocco	18,800	79,947	103,064	89,339	91,000 ^r	100,000	110,000	115,000
Namibia	37,700	30,209	39,126	37,622	42,685 ^r	80,000	180,000	180,000
South Africa	75,000	70,241	62,703	61,221	64,173 ^r	35,000	35,000	35,000
Tunisia	3,960	44,244	41,247	40,000	35,692 ^r	36,000 ^r	20,000 ^r	2,000 ^r
Total	201,000	236,000	257,000	240,000	242,000 ^r	264,000 ^r	357,000 ^r	394,000 ^r

^eEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Nigeria also mined a small quantity of zinc.

TABLE 24
AFRICA: HISTORIC AND PROJECTED ZINC METAL PRODUCTION, 1990-2007¹

(Metal content in metric tons)

Country ²	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Algeria	23,600	30,000	34,000	34,000	26,136 ^r	34,000	34,000	34,000
Congo (Kinshasa)	38,200	--	--	--	--	--	--	50,000
Namibia	--	--	--	--	35 ^r	150,000	150,000	150,000
South Africa	92,000	98,782	103,000	109,000	105,000 ^r	100,000	100,000	100,000
Total	154,000	129,000	137,000	143,000	131,000 ^r	284,000 ^r	284,000 ^r	330,000 ^r

^eEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Nigeria also refined a small quantity of zinc.

TABLE 25
AFRICA: HISTORIC AND PROJECTED DIAMOND MINE PRODUCTION, 1990-2007¹

(Thousand carats)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Angola	1,130	2,900	4,349	5,159	5,022 ^r	6,000	7,000	7,000
Botswana	17,400	16,802	24,635	26,416	28,397 ^r	27,000	26,000	26,000
Central African Republic	381	530	461	449	415	(^e)	(^e)	(^e)
Congo (Kinshasa)	19,400	22,024	16,000	18,200	18,556 ^r	18,000	17,000	17,000
Côte d'Ivoire	12	75	320	309	307	(^e)	(^e)	(^e)
Gabon	1	1	1	1	1	(^e)	(^e)	(^e)
Ghana	650	632	878	1,170	963	(^e)	(^e)	(^e)
Guinea	127	365	369	364	491	(^e)	(^e)	(^e)
Lesotho	NA	NA	2	1	1	(^e)	(^e)	(^e)
Liberia	100	150	170	170	80	(^e)	(^e)	(^e)
Namibia	763	1,382	1,552	1,487	1,562 ^r	1,500	2,000 ^r	2,500 ^r
Sierra Leone	78	214	77	223	352	(^e)	(^e)	(^e)
South Africa	8,710	9,683	10,790	11,163	10,876 ^r	11,000	14,000 ^r	14,000 ^r
Tanzania	85	50	354	254	213	(^e)	(^e)	(^e)
Zimbabwe	--	204	23	--	--	(^e)	(^e)	(^e)
Undistributed	--	--	--	--	--	3,100 ^r	3,400 ^r	3,500 ^r
Total	48,800	55,000	60,000	65,400	67,200 ^r	66,600 ^r	69,400 ^r	70,000 ^r

^eEstimated. ^rRevised. -- Negligible or no production. NA Not available.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Included in "Undistributed."

TABLE 26
AFRICA: HISTORIC AND PROJECTED ILMENITE MINE PRODUCTION, 1990-2007¹

(Thousand metric tons of TiO₂)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Egypt ^e	--	30	66	66	66	69	69	69
Kenya	--	--	--	--	--	--	35 ^r	150
Mozambique	--	--	--	--	--	--	320 ^r	480 ^r
Sierra Leone	33	--	--	--	--	--	70 ^r	70 ^r
South Africa	567	890	954	928	930	1,000	1,090	1,090
Total	600	920	1,020	994	996	1,070	1,580 ^r	1,860 ^r

^eEstimated. ^rRevised. -- Negligible or no production.

¹Includes leucoxene. Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 27
AFRICA: HISTORIC AND PROJECTED PHOSPHATE ROCK PRODUCTION, 1990-2007¹

(Thousand metric tons P₂O₅ content)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Algeria	333	500	265	280	230 ^r	310	310	310
Burkina Faso	NA	NA	NA	(²)	1	1	1	1
Egypt	286	207	317	293	434 ^r	420	420	420
Mali	2	1	--	--	--	--	--	--
Morocco	6,910	6,399	7,200	7,400	7,700 ^r	7,400	7,740	8,420
Senegal	823	556	720	656	660	660	660	660
South Africa	1,200	1,101	1,083	995	1,086 ^r	900	900	780
Tanzania	8	2	5	4	8 ^r	8 ^r	8 ^r	8 ^r
Togo	840	930	500	380	460	530 ^r	760	1,200
Tunisia	1,860	2,181	2,500	2,440	2,300 ^r	2,460	2,460	2,460
Zimbabwe	52	45	25	28	26	22	22	38
Total	12,300	11,900	12,600	12,500	12,900	12,700 ^r	13,300	14,300

^cEstimated. ^rRevised. -- Negligible or no production. NA Not available.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

TABLE 28
AFRICA: HISTORIC AND PROJECTED SALABLE COAL, 1990-2007¹

(Thousand metric tons)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Botswana	793	898	947	930	953 ^r	950	950	950
Congo (Kinshasa)	100	10	--	1	1 ^r	2	10	20
Egypt	--	10	400	400	400	400	400	400
Malawi ²	41	15	34	34	82 ^r	235 ^r	235 ^r	275 ^r
Morocco	526	650	31	2	-- ^r	--	--	--
Mozambique	40	40	16	28	44 ^r	37 ^r	40 ^r	40 ^r
Niger	154	135	158	163	183 ^r	160	160	160
Nigeria	78	29	12	11	11 ^r	40	80	100
South Africa	175,000	206,210	224,118	223,500	220,200 ^r	225,000	235,000	250,000
Swaziland	151	172	178	78	313 ^r	300	300	400
Tanzania	52	43	79	78	79 ^r	80 ^r	80 ^r	1,600
Zambia	382	141	168	211	64 ^r	150	150	200
Zimbabwe	5,500	5,538	3,809	4,064	3,721 ^r	2,800	3,500	4,000
Total	183,000	214,000	230,000	230,000	226,000	230,000	241,000 ^r	258,000 ^r

^cEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Malawi was the only African producer of lignite in 2002.

TABLE 29
AFRICA: HISTORIC AND PROJECTED DRY NATURAL GAS PRODUCTION, 1990-2007¹

(Million cubic meters)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Algeria	48,500	58,100	100,092	102,332	101,557 ^r	101,000	111,000	122,000
Angola	538	560	560	--	-- ^r	560	3,000	5,500
Congo (Kinshasa)	--	--	--	--	--	30	60	60
Côte d'Ivoire	--	36	1,323	1,230	1,350 ^r	1,500	1,200	1,200
Egypt	7,900	12,536	21,000	21,000	27,900 ^r	31,000	29,000	29,000
Equatorial Guinea	--	--	98	790	1,050 ^r	1,350	1,350	1,400
Ethiopia	--	--	--	--	--	--	-- ^r	100
Gabon	150	150	99	99	100	103	100	100
Libya	6,200	6,345	5,400	5,600	5,700 ^r	7,200	17,000	27,000
Morocco	37	22	44	43	42 ^r	36	37	35
Mozambique	--	--	1	1	2 ^r	2 ^r	2,100 ^r	2,100 ^r
Nigeria	3,230	5,000	21,945	39,640	45,000 ^r	45,000 ^r	50,000 ^r	57,000 ^r
Senegal	110	110	56	56	50	41	33	33
South Africa	--	1,980	2,088	1,800	2,000 ^r	2,000	1,900	1,900
Sudan	--	--	--	--	--	-- ^r	10	10
Tanzania	--	--	--	--	--	-- ^r	720 ^r	720 ^r
Tunisia	200	250	1,600	1,800	1,700 ^r	1,900	2,100	2,300
Total	66,900	85,100	154,000	174,000	186,000 ^r	192,000 ^r	220,000 ^r	250,000 ^r

^cEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 30
AFRICA: HISTORIC AND PROJECTED CRUDE PETROLEUM, INCLUDING CONDENSATE, PRODUCTION, 1990-2007¹

(Thousand 42-gallon barrels)

Country	1990	1995	2000	2001	2002	2003 ^c	2005 ^c	2007 ^c
Algeria	444,000	438,730	476,288	464,600	499,890 ^r	550,000	600,000	600,000
Angola	174,000	232,800	273,000	270,100	329,600 ^r	511,000	571,000	620,000
Benin	1,416	654	365	365	--	--	--	--
Cameroon	64,600	39,400	32,100	29,200	28,000 ^r	27,000	24,000	24,000
Chad	--	--	--	--	-- ^r	30,000	84,000	84,000
Congo (Brazzaville)	58,800	63,875	95,630	98,920	94,170 ^r	92,000	90,000	90,000
Congo (Kinshasa)	10,600	10,087	8,500	8,500	8,500 ^r	9,400	9,800	9,800
Côte d'Ivoire	770	2,000	11,700	18,914	18,000 ^r	3,000	2,600	2,600
Egypt	319,000	335,800	285,000	277,000	274,000 ^r	210,000	220,000	220,000
Equatorial Guinea	--	2,300	39,000	66,000	69,000 ^r	65,000	90,000	90,000
Gabon	100,000	133,000	118,625	110,000	108,000 ^r	120,000	115,000	115,000
Ghana	--	--	2,555	3,285	3,300 ^r	2,300	2,200	4,000
Libya	502,000	509,175	538,000	520,000	502,000 ^r	650,000	700,000	700,000
Morocco	114	36	97	95	91 ^r	35	35	35
Nigeria	660,000	740,000	783,000	823,000	773,000 ^r	1,000,000	1,350,000	1,500,000
Senegal	8	2	1	1	--	--	--	--
South Africa	--	--	6,606	13,870	10,950 ^r	20,000	20,000	22,000
Sudan	--	730	67,152	77,755	87,759 ^r	114,000 ^r	205,000 ^r	274,000 ^r
Tunisia	36,500	32,690	28,207	26,300	26,800 ^r	22,000	18,000	18,000
Total	2,370,000	2,540,000	2,770,000	2,810,000	2,830,000 ^r	3,430,000 ^r	4,100,000 ^r	4,370,000 ^r

^cEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 31
AFRICA: HISTORIC AND PROJECTED URANIUM PRODUCTION, 1990-2007¹

(Metal content in metric tons)

Country	1990	1995	2000	2001	2002	2003 ^e	2005 ^e	2007 ^e
Gabon	702	653	--	--	--	--	--	--
Namibia	3,214	2,006	2,714	2,239	2,333 ^r	2,300	2,400	2,700 ^r
Niger	2,681	2,970	2,895	2,919	3,076 ^r	3,100 ^r	3,300 ^r	3,000
South Africa	2,442	1,443	861	903	846 ^r	850	850	850
Total	9,040	7,070	6,470	6,060	6,260 ^r	6,250 ^r	6,550 ^r	6,550 ^r

^eEstimated. ^rRevised. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.