



# 2008 Minerals Yearbook

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## AFRICA

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# THE MINERAL INDUSTRIES OF AFRICA

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The 56 independent nations and other territories of continental Africa and adjacent islands covered in this volume encompass a land area of 30.1 million square kilometers, which is more than three times the size of the United States, and were home to 984 million people in 2008. 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, chromite, cobalt, hafnium, industrial diamond, manganese, phosphate rock, platinum-group metals (PGM), soda ash, vermiculite, and zirconium.

The mineral industry was an important source of export earnings for many African nations in 2008. To promote exports, groups of African countries have formed numerous trade blocs, which included the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), the Economic Community of Central African States, the Economic Community of West African States, the Mano River Union, the Southern African Development Community (SADC), and the West African Economic and Monetary Union. Algeria, Angola, Libya, and Nigeria were members of the Organization of the Petroleum Exporting Countries (OPEC). In 2008, COMESA, EAC, and SADC agreed to form an expanded free-trade zone. 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.

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For mineral production statistics—

- Algeria—Ministry of Energy and Mines,
- Benin—Ministry of Mines, Energy, and Water,
- Burundi—Ministry of Energy and Mines,
- Côte d'Ivoire—National Institute of Statistics,
- Egypt—Ministry of Petroleum,
- Ethiopia—Ministry of Mines and Energy,
- Gambia—Geological Department,
- Ghana—Minerals Commission,
- Guinea—Ministry of Mines, Geology, and Environment; National Directorate of Statistics,
- Mali—National Directorate of Geology and Mines,
- Mauritania—National Office of Statistics,
- Mauritius—Central Statistics Office,
- Morocco—Directorate of Statistics,
- Mozambique—National Directorate of Mines,
- Namibia—Ministry of Mines and Energy,

- Niger—National Institute of Statistics,
  - South Africa—Department of Minerals and Energy, Mineral Economics Directorate,
  - Swaziland—Central Statistical Office,
  - Tunisia—Industrial Promotion Agency,
- For basic economic data—the International Monetary Fund.  
For mineral consumption data—
- BP p.l.c.,
  - Department of Minerals and Energy of the Republic of South Africa, and
  - International Iron and Steel Institute.
- For exploration and other mineral-related information—the Metals Economics Group (MEG) in Canada.

## General Economic Conditions

In 2008, the real gross domestic product (GDP) of Africa increased by 5.2% after increasing by 6.3% in 2007. In 2008, the GDP increased by an average of 6.1% in African petroleum-exporting countries and by an average of 4.7% in African petroleum-importing countries. GDP growth in African petroleum-exporting countries was projected to be at or about 2.2% in 2009 and 5.1% in 2010. In petroleum-importing countries, GDP growth was expected to be at or about 1.4% in 2009 and 3.3% in 2010 (International Monetary Fund, 2009, p. 90).

Decreased economic growth is likely to be the result of the worldwide economic crisis that started in late 2007. In Botswana, the GDP is expected to decrease by about 10.2% in 2009 because of the collapse in global demand for diamond. South Africa's GDP is likely to decrease by 2.2% in 2009 in part because of a broadly based decrease in mineral production. Angola, Equatorial Guinea, and Nigeria were likely to face adverse economic effects from the decrease in worldwide petroleum demand (International Monetary Fund, 2009, p. 89-90, 173).

## Investment Data and Political Risk

Despite the decrease in the GDP in 2009 in South Africa, numerous new mines and expansions of existing mines were planned that included coal, diamond, gold, iron ore, manganese, PGM, titanium, and zirconium mines. The estimated capital costs of the expansion of the Sishen iron ore mine was \$1.2 billion; the new Sishen South iron ore mine, \$1.1 billion; the Goedgevonden coal mine, \$390 million; the Burnstone gold mine, \$238 million; and the Xolobeni mineral sands mine, \$200 million.

Elsewhere, capital expenditure for the Ambatovy nickel mine in Madagascar was expected to total \$3.3 billion by 2013. The capital costs of the Moatize and the Benga coal mines in Mozambique were estimated to be \$1.4 billion and

\$800 million, respectively. In the Democratic Republic of the Congo [Congo (Kinshasa)], the estimated capital cost of the Tenge Funkurume copper mine was \$1.9 billion; the Ruashi Mine, \$335 million; and the Kinsevere Mine, \$200 million. The capital cost of the Kouilou potash mine in the Republic of the Congo [Congo (Brazzaville)] was estimated to be \$723 million.

Projects in the feasibility or prefeasibility stage included the Twangiza and the Moto gold mines in Congo (Kinshasa), which had estimated capital costs of \$541 million and \$483 million, respectively. In Madagascar, the capital cost of the Ranobe mineral sands project was expected to be \$250 million. The capital cost of the proposed Kanyika niobium (columbium) mine in Malawi was estimated to be between \$156 million and \$177 million.

Countries directly affected by wars, internal ethnic or political conflicts, and refugee displacements in 2008 included Chad, Congo (Kinshasa), Côte d'Ivoire, Ethiopia, Nigeria, Somalia, Sudan, and Uganda.

## Legislation

High mineral commodity prices at the beginning of 2008 led some Governments in Africa to review existing mining agreements with a view toward increasing state revenues from exploration and mining companies. Mineral exploration projects in Congo (Kinshasa) are ongoing in spite of concerns related to the Government's reevaluation of mining contracts and unrest in parts of the country (Vaccaro, 2008). Mining contracts in Guinea are also being reviewed after a change in government following the death of President Conte (Mukumbira, 2008; Mining Review Africa, 2009). In November 2007, the Government of Tanzania appointed the Mining Review Contracts Committee to review all mining contracts. In July 2008, the Committee recommended that the Government own 10% of the shares of all mining companies in Tanzania (Mining Journal, 2008).

Zimbabwe implemented its Indigenization and Economic Empowerment Act in 2008, which requires that indigenous Zimbabweans own at least 51% of any business operating in Zimbabwe. Zimbabwe's central bank has proposed reforms to the country's mining sector that would effectively make the Zimbabwe Mining Development Corp. the sole explorer for minerals; the reforms would also put in place a strict monitoring of the production, refining, and valuing of precious metals on site and ban the export of unprocessed minerals containing chrome, raw diamond, gold, and PGM (Nkala, 2009). In light of the decrease in commodity prices and economic uncertainty at the end of 2008, it was unclear how many of the proposed legislative changes would be enacted or enforced (Thomson Reuters, 2009).

## Exploration

Exploration activity, as defined by African exploration budgets reported by the MEG, increased by 19% to \$1.9 billion in 2008 from about \$1.6 billion in 2007. The share of Africa exploration in the total worldwide exploration budget decreased slightly to about 15% in 2008. In 2008, the principal mineral commodities of interest for exploration in Africa were base

metals, diamond, gold, PGM, and uranium (Metals Economics Group, 2008).

Exploration was focused primarily in (in order of the number of sites being actively explored) South Africa, Zambia, Namibia, Tanzania, Congo (Kinshasa), Ghana, Burkina Faso, and Mali, but activity also took place in a number of other countries. Gold targets accounted for approximately 33% of reported African exploration projects; PGM made up about 15%; copper and diamond each represented about 13%; uranium made up about 12%; and base metals made up about 7%. Based on the number of active exploration sites, early-stage projects composed about 53% of the 2008 activity, whereas producing projects accounted for about 24% and feasibility stage projects represented about 16%.

Exploration activity in Africa in 2008 fluctuated widely over the course of the year as the result of changing commodity prices, disruption of mineral supply owing to electricity shortages and regional unrest, and reduced credit availability. At the beginning of 2008, commodity prices were high and mineral exploration was active in many areas of the region. Australian and Canadian companies, which have traditionally invested heavily in African minerals projects, announced plans to continue such investment. China announced ambitious plans to invest in the mineral sector of such African countries as Congo (Kinshasa), Guinea, Niger, South Africa, and Zambia. Indian-owned companies expanded efforts to prospect for gold and uranium in Niger and announced development plans for manganese and iron ore projects in Côte d'Ivoire (Cocks, 2008). Russian firms were also investigating opportunities to gain additional access to African minerals (Pfeiffer, 2008). Exploration activity in South Africa was affected by electricity shortages in early 2008. Despite high levels of interest in exploration, global financial difficulties at the end of 2008 further affected mineral-dependent economies in Africa, particularly Botswana, Congo (Kinshasa), South Africa, Zambia, and Zimbabwe, leading to layoffs and scaled-back investment and growth projections (Tsiko, 2009).

## Commodity Overview

Estimates for production of major mineral commodities for 2008 and beyond have been based upon supply-side assumptions, such as announced plans for increased production/new capacity construction and bankable feasibility studies. The outlook tables in this summary chapter show historic and projected production trends; therefore, no indication is made about whether the data are estimated or reported and revisions are not identified. Data on individual mineral commodities in tables in the individual country chapters are labeled to indicate estimates and revisions. The outlook segments of the mineral commodity tables are based on projected trends that could affect current (2008) producing facilities and on planned new facilities that operating companies, consortia, or Governments have projected to come online within indicated timeframes. Forward-looking information, which includes estimates of future production, exploration and mine development, cost of capital projects, and timing of the start of operations, are subject to a variety of risks and uncertainties that could cause actual events or results to differ significantly from expected outcomes. Projects listed in

the following section are presented as an indication of industry plans and are not a USGS prediction of what will occur.

## **Metals**

**Aluminum and Bauxite and Alumina.**—*Production.*—In 2008, African production of refined aluminum decreased by 5% compared with that of 2007. South Africa accounted for about 47% of African aluminum output; Mozambique, 31%; and Egypt, 15% (table 6). Africa accounted for 4% of the world's aluminum production in 2008. In Mozambique and South Africa, production decreased because of power supply constraints. The smelter at Ikot Abasi reopened in Nigeria.

African bauxite production increased by 5% in 2008. In Guinea, production increased at Compagnie des Bauxites de Guinée and Compagnie des Bauxites de Kindia's mines. Output decreased at the Sierra Mineral Mine in Sierra Leone. Guinea accounted for about 91% of African bauxite production, and Sierra Leone, 5% (table 5). In 2008, Africa's share of world bauxite production was 9%.

*Consumption.*—In 2008, world aluminum consumption amounted to 36.9 million metric tons (Mt) compared with 37.2 Mt in 2007. Africa accounted for about 2% of world aluminum consumption in 2008 (Chili, 2009a).

*Outlook.*—The production of refined aluminum is expected to increase by an average of about 3% per year from 2008 to 2015. Output is likely to increase at the Nag Hammadi smelter in Egypt by 2011. In Nigeria, the smelter at Ikot Abasi could reach full capacity by 2013. In Ghana, the reopening of the Valco smelter by 2013 would depend upon reliable power supplies (table 6).

African bauxite production is likely to remain nearly unchanged from 2008 to 2015. Ghana's production is expected to increase by about 15% by 2013 (table 5).

**Copper.**—*Production.*—Africa's mine production of copper increased by about 15% in 2008 compared with that of 2007. In 2008, Zambia accounted for 58% of African copper mine production; Congo (Kinshasa), 24%; and South Africa, 11% (table 7). Africa's share of world copper mine production was 6% in 2008. The production increase in Congo (Kinshasa) was attributable to increased output from the Etoile, the Frontier, the Kalumines, the Kinsevere, the KTO, the Ruashi, and the T17 Mines. The Dikilushi, the Kulu, the Luiswishi, and the Tilwezembe Mines were shut down in late 2008 because of the worldwide economic crisis, and the Lonshi Mine was shut down because of resource depletion. In South Africa, output increased at the Palabora Mine. Production also increased in Zambia.

Africa's refined copper production increased by 5% from 2007 to 2008. In 2008, Zambia accounted for 72% of African refined copper production; South Africa, 17%; and Congo (Kinshasa), 8% (table 8). In Congo (Kinshasa), the Ruashi solvent extraction-electrowinning (SX/EW) plant opened in 2008 and production increased at the Etoile, the Luilu, and the Luita SX/EW plants. Production also increased in Zambia. Decreased output in South Africa was mostly attributable to reduced output from the Palabora refinery. Egypt was the only producer of secondary refined copper in Africa; primary production accounted for most African production.

*Consumption.*—In 2008, world refined copper consumption decreased by about 1% to 18 Mt. Africa's share of global copper consumption amounted to about 2% in 2008. South Africa's consumption decreased to 68,000 t in 2008 from 77,000 t in 2007 (Chili, 2009b).

*Outlook.*—African copper mine production is expected to increase by an average of about 9% per year from 2008 to 2015. Congo (Kinshasa) is likely to account for a majority of the increase in output. The Tenke Fungurume Mine is planned to open in 2009, and the Kipoi Mine, in 2010. Increased production is also likely at the Etoile and the Ruashi Mines in 2009 and at the Kinsevere Mine in 2011. The first phase of the expansion of the Kamoto and the KOV Mines is expected to be completed in 2011, and the second phase, in 2015. The Congolese share of African copper production is likely to increase to 42% in 2015 from 24% in 2008 (table 7; Mining Journal, 2010a, b).

Nevsun Resources Ltd. plans to mine from a copper-rich zone at the Bisha Mine in Eritrea from late 2012 to 2015. South Africa's production is expected to increase because of the expansion of the Nkomati nickel mine by 2012. In Botswana, the Boseto Mine is likely to open in 2012. Tanzania's output is likely to increase with the opening of the Buzwagi gold mine in 2009 (table 7).

The production of refined copper is expected to increase by between 12% and 13% per year from 2008 to 2015. In Congo (Kinshasa), new SX/EW plants could open at Tenke Fungurume in 2009 and at Kinsevere in early 2011. Increased production is also expected from the Etoile, the Luilu, the Luita, and the Ruashi plants. The first phase of expansion at Luita is likely to be completed in 2011, and the second phase, in 2015. Congo (Kinshasa), which produced less than 1% of Africa's refined copper in 2007, could account for 52% of the continent's refined copper output by 2015 (table 8; Mining Journal, 2010a, b).

**Gold.**—*Production.*—Africa's gold mine production was about 439,000 kilograms (kg) in 2008, which was a decrease of about 9% compared with that of 2007. Production decreased significantly since 1995 because of the long-term decline in South African production that more than offset the increased output in Ghana, Guinea, Mali, and Tanzania (table 9). In 2008, Africa's share of world gold mine production was about 22% (table 4).

In South Africa, the decrease in production was broadly based, with output declining from each of the country's five leading gold producers. Decreases in Ghana's gold production were partially attributable to the Chirano and the Tarkwa Mines. In Tanzania, decreased production from the Bulyanhulu, the Geita, and the North Mara Mines more than offset the production increases from the Golden Pride and the Tulawaka Mines. Mali's production decreased in 2008; the decreases in output from the Loulo, the Morila, and the Yatela Mines more than offset the increased output from the Sadiola Mine. Production also decreased in Ethiopia, Kenya, Niger, Sudan, and Zimbabwe (table 9).

In Guinea, production increased at the Kiniero, the Lero, and the Siguiri Mines in 2008. Output increased in Burkina Faso because of the opening of the Kalsaka, the Mana, and the Youga Mines. Côte d'Ivoire's production increased because of the opening of the Angovia and the Bonikro Mines (table 9).

In 2008, South Africa accounted for 49% of African gold production; Ghana, 18%; Mali, 9%; and Tanzania, 8%. South Africa's share of continental gold production decreased from 81% in 1995 because of rising production costs associated with deeper underground operations and increased production in Ghana, Guinea, Mali, and Tanzania (table 9).

**Outlook.**—Gold mine production in Africa is expected to increase by an average of about 4% per year from 2008 to 2015. The long-term decline in South Africa's production could be reversed because of the reopening of mines in the Central Rand gold fields and the opening of the Modder East Mines in 2009, and the opening of the Burnstone and the Weltdvreden Mines in 2010 and 2011, respectively. Other new gold projects include the Ergo Mine and the Tshepong Decline project in 2008 and the planned expansion of the Masimong Mine in 2010. The expansion of the Tau Lekoa Mine is expected to be completed in 2010; the Phakisa and the Savuka Mines, in 2011; the Doornkop, the Elandsrand, and the Moab Khotsoeng Mines, in 2012; and the South Deep Mine, in late 2014. The opening of uranium mines, including the Buffelsfontein and Ezulwini Mines, is also likely to contribute to increased gold production; gold is a coproduct at these mines (table 9; Simmer and Jack Mines Ltd., 2010).

In Ghana, the outlook is for an increase in output because of increased production from the Bogosu/Prestea, the Chirano, the Damang, the Obuasi, and the Wassa Mines by 2011 and the startup of the Southern Ashanti project by 2013. Tanzania's production is likely to increase with the opening of the Buzwagi Mine in 2009 and increased production at the Geita Mine; these increases could more than offset the planned closures of the Tulawaka and the Golden Pride Mines in 2011 and 2013, respectively. In Mali, the expansion of the Loulo and the Yatela Mines and the reopening of the Syama Mine by 2011 are expected to more than offset the decreased output from the Morila Mine (table 9).

Burkina Faso's production is expected to increase with the expansions of the Kalsaka, the Taparko-Boroum, and the Youga Mines by 2011. In Mauritania, output is likely to increase at the Tasiast Mine. The outlook for Côte d'Ivoire is for a substantial increase in production because of the opening of the Tongon Mine and the expansion of the Bonikro Mine. In Ethiopia, the Sakaro Mine is likely to open in 2011, and the Werseti Mine, in 2015. Production could increase in Zimbabwe, depending upon the restoration of economic and political stability (table 9).

Several African countries that had only artisanal gold production in 2008 are likely to open large-scale gold mines in the near future. In Congo (Kinshasa), the Twangiza Mine could open in late 2011; the Namoya Mine, in 2012; and the Kibali Mine, in 2014. Gold-rich zones in the Bisha Mine in Eritrea are planned to be mined from 2010 to 2012. Other new mines opening include the Sabodala Mine in Senegal in 2009, the Sukari Mine in Egypt in 2009, and the Passendro Mine in the Central African Republic in 2010 (table 9).

Other African countries are expected to lose their only large-scale gold mines in the near future. The Hassai Mine in Sudan is likely to shut down in 2012, and the Mupane Mine in Botswana, in 2013 (table 9).

**Iron and Steel.—Production.**—African production of crude steel decreased by about 3% in 2008 compared with that of 2007. In South Africa, the decrease in output was partially attributable to decreased output at the Saldanha plant. Production decreased in Algeria and Libya and increased in Mauritania and Morocco. South Africa accounted for 44% of regional crude steel production; Egypt, 32%; Libya, 6%; and Algeria, 3% (table 11). Africa's share of world crude steel production amounted to 1% in 2008 (table 4).

In 2008, Egypt's production of hot-rolled steel products was 6.77 Mt compared with 6.67 Mt in 2007. In South Africa, output decreased to 6.42 Mt in 2008 from 7.11 Mt in 2007, and in Morocco, to 0.92 Mt from 1.02 Mt. Other African producers of hot-rolled steel products included Algeria, Libya, and Tunisia (World Steel Association Committee on Economic Studies, 2010, p. 39).

**Consumption.**—In 2008, world finished steel consumption decreased to 1.21 billion metric tons (Gt) from 1.22 Gt in 2007. African finished steel consumption increased to nearly 26.8 Mt in 2008 from 22.9 Mt in 2007. Egypt accounted for 24% of African finished steel demand; South Africa, nearly 23%; Algeria, 19%; Morocco, 9%; Nigeria, 6%; and Libya and Tunisia, 5% each (World Steel Association Committee on Economic Studies, 2010, p. 95-96).

**Outlook.**—Crude steel production is expected to increase by an average of 3% per year from 2008 to 2015. Nigeria could more than double its production with the opening of the Ajaokuta plant and the reopening of the Delta plant by 2015. ArcelorMittal plans to increase output in Algeria and to open a new plant in Egypt by 2011. Production could increase in Zimbabwe from 2011 to 2015 as Zimbabwe Iron and Steel Co. restores its capacity; improvement in this company's situation depends upon the restoration of economic and political stability. Output is also expected to increase in Libya, Mauritania, and Tunisia (table 11).

**Iron Ore.—Production.**—In 2008, the iron content of ore produced in Africa amounted to 40.1 Mt. Increased production in South Africa was attributable to the Beeshoek and the Sishen Mines. Production decreased in Egypt and Mauritania. South Africa was the leading iron ore producer in Africa and accounted for 77% of continental output; Mauritania, 18%; and Algeria, 3% (table 10).

**Outlook.**—The iron content of ore produced in Africa is expected to increase to about 79 Mt in 2015 (table 10). In South Africa, the current expansion of the Sishen Mine is likely to be completed in 2010; a further expansion of the mine could be completed by 2013. Production at the Khumani Mine is planned to reach full capacity in 2010; a further expansion of the mine could be completed by 2013. Increased output at Khumani would more than offset the expected decrease in output from the Beeshoek Mine starting in 2009. The Beeshoek Mine is planned for closure in 2015. In Gabon, mining at the Belinga iron ore deposit could start by 2015. Senegal's Faleme deposit is expected to be mined starting in 2015. In Algeria, increased production would be attributable to the Al-Wenza and the Bou Khadra Mines. Production is also expected to increase in Egypt and Mauritania (table 10).

Gabon and Senegal did not produce iron ore in 2008; their shares of African iron ore production by 2015 are expected to

be 15% and 9%, respectively. South Africa's share is likely to decline to 61% from 72% in spite of a substantial increase in domestic production (table 10).

**Nickel.**—*Production.*—African mine production of nickel decreased by 8% in 2008. Output decreased in South Africa and Zimbabwe and increased in Botswana. Most of South Africa's nickel output was a coproduct of PGM mining. In 2008, South Africa accounted for 47% of African nickel mine output; Botswana, 43%; and Zimbabwe, 10% (table 12). Minor tonnages of nickel were recovered as a byproduct of cobalt operations in Morocco.

*Outlook.*—Nickel mine production is likely to increase by an average of 13% per year from 2008 to 2015. The startup of the Ambatovy nickel and cobalt mine in Madagascar in late 2010 is expected to account for the majority of the increase. Madagascar, which did not mine nickel in 2008, could have a 38% share of African nickel mine production by 2013. Increased output is expected in South Africa because of increased capacity at the Nkomati nickel mine and the opening of the Booyseindal, the Mphahlele, and the Pilanesberg PGM mines. In Zambia, Albidon Ltd. plans to start production from the Munali project. Output is expected to decrease in Zimbabwe because of the closure of the Shangani Mine (table 12).

**Platinum-Group Metals.**—*Production.*—From 2007 to 2008, Africa's production of platinum and palladium decreased by 9% each. In South Africa, production decreases at the Amandelbult, the Bafokeng-Rasimone, the Everest, the Marikana, the Rustenburg, and the Union Mines more than offset increased production at the Elandsfontein, the Kroondal, and the Two Rivers Mines. PGM production increased in Zimbabwe. South Africa, which was the continent's dominant producer of PGM, accounted for 96% and 95% of the production of platinum and palladium, respectively (tables 13, 14).

*Outlook.*—African mine production of palladium is expected to increase by an average of 4% per year from 2009 to 2015. Platinum mine production is likely to increase by an average of 3% per year from 2009 to 2015. In South Africa, the increase is likely to be attributable to the opening of the Blue Ridge, the Pilansberg, and the Smokey River Mines in 2009; the Kalahari Mine in 2011; the Booyseindal, the Grootboom, and the Mphahlele Mines in 2012; and the Western Bushveld Project in early 2013. Expansions are planned to be completed at the Nkomati nickel mine in 2011; the Zondereinde Mine in 2012; the Two Rivers Mine in 2013; the Elandsfontein Mine in 2014; and the Marikana Mine in 2015. The Everest Mine is scheduled to reopen in 2010. Output in Zimbabwe could also increase (tables 13, 14; Avery, 2009; Dubbelman, 2010; Pringle, 2010).

**Tin.**—*Production.*—In 2008, African tin mine production increased by about 31% compared with that of 2007. Increased output in Congo (Kinshasa) was attributable to increased artisanal and small-scale mining activity in Nord-Kivu Province. Production also increased in Rwanda. In 2008, Congo (Kinshasa) accounted for 90% of African tin mine production, and Rwanda, 8% (table 15).

Africa did not produce refined tin in 2008 (table 18). Production of tin metal ceased in Nigeria and Rwanda in 2005 and 2006, respectively.

*Outlook.*—African tin mine production is expected to increase by about 5% by 2015 because of the expansion of small-scale mining operations in Rwanda and the opening of the Abu Dabbab tin and tantalum mine in Egypt (table 15). Increased output in Egypt and Rwanda is likely to more than offset decreased output in Congo (Kinshasa). African countries are unlikely to open new tin refineries by 2015 because of high energy costs (table 16; Holland, 2009; New Times, 2009).

**Zinc.**—*Production.*—During 2008, Africa's mine production of zinc increased by about 18%. Production increased in Morocco. In Namibia, production decreased at the Rosh Pinah Mine. Output also decreased at the Black Mountain Mine in South Africa. In 2008, Morocco accounted for 53% of African zinc mine production; Namibia, 21%; South Africa, 16%; and Congo (Kinshasa), 10% (table 17). Africa's share of world zinc mine production was about 2% in 2008 (table 4).

African production of zinc metal decreased by nearly 7% in 2008. Production decreased at the Skorpion smelter in Namibia and at the Zincor smelter in South Africa. Namibia accounted for 55% of continental zinc metal production in 2008; South Africa, 33%; and Algeria, 12% (table 18).

*Consumption.*—In 2008, world refined zinc consumption increased to 11.5 Mt from 11.3 Mt in 2007. Africa's share of global zinc consumption amounted to about 2% in 2008 (Pitso, 2009).

*Outlook.*—African zinc mine production is expected to increase by an average of 8% per year from 2008 to 2015. In Algeria, the Tala Hamza zinc project is likely to commence operations by 2011. Algeria, which did not mine zinc in 2008, could account for 34% of continental zinc mine production in 2015. In South Africa, the Pering Mine could reopen in late 2011 (table 17). Continental production of zinc metal is not likely to change significantly from 2008 to 2015 (table 18).

## **Industrial Minerals**

**Cement.**—*Production.*—In 2008, Africa's production of cement amounted to 128.8 Mt compared with 117.6 Mt in 2007. Most of the increase was attributable to Egypt, Libya, and Morocco. Egypt accounted for 32% of African cement output; Algeria, 14%; Morocco and South Africa, 11% each; and Libya and Tunisia, 6% each.

*Consumption.*—Africa consumed 150.8 Mt of cement in 2008, which was about 5% of world cement consumption.

**Diamond.**—*Production.*—In 2008, Africa's share of world diamond production, by volume, was 55%. African diamond production decreased by about 10% in 2008 compared with that of 2007. Congo (Kinshasa) accounted for a majority of the decrease in production, by volume. Société Minière de Bakwanga (MIBA) shut down in 2008 and artisanal miners sought employment in the agricultural sector after many diamond traders shut down operations because of the worldwide economic crisis.

In South Africa, increased output from the opening of the Voorspoed Mine was more than offset by decreased output from the Kimberley, the Namaqualand, and the Venetia Mines. The decrease in Tanzania's production was attributable to the Williamson Mine. In Botswana, the decrease in production from

the Oropa Mine more than offset the increase in production from the Damtshaa, the Jwaneng, and the Letlhakane Mines. Production by artisanal and small-scale miners decreased in Central African Republic, Ghana, and Sierra Leone. Angola's production also decreased.

In Guinea, production increased sharply because of increased output by artisanal and small-scale miners. Diamond production also increased in Namibia and Zimbabwe. Botswana accounted for 39% of African diamond output by volume; Congo (Kinshasa), 25%; South Africa, 15%; and Angola, 11% (table 19).

In 2008, the global value of rough diamond production amounted to \$14.3 billion, of which Africa accounted for more than 60%. Botswana accounted for 24% of the value of global rough diamond output; Angola, 12%; South Africa, 11%; Congo (Kinshasa), 8%; and Namibia, 6%. The global value of polished diamond production amounted to \$19.7 billion, of which South Africa accounted for nearly 5% (Even-Zohar, 2009).

In November 2002, the Kimberley Process Certification Scheme (KPCS) was established to reduce the trade in conflict diamond, particularly diamond originating from Angola, Congo (Kinshasa), and Sierra Leone. The establishment of the KPCS involved Government officials from more than 50 countries that produced, processed, and imported diamond as well as representatives from the European Union, the World Diamond Council, and nongovernmental organizations. As of December 2008, the following African countries had met the minimum requirements of the KPCS: Angola, Botswana, Central African Republic, Congo (Brazzaville), Congo (Kinshasa), Ghana, Guinea, Lesotho, Liberia, Mauritius, Namibia, Sierra Leone, South Africa, Tanzania, Togo, and Zimbabwe.

In December 2005, the United Nations Security Council banned the importation of rough diamond from Côte d'Ivoire because of the alleged link between illegal diamond mining and the country's unresolved armed conflict. The ban was still in effect at the end of 2008 (United Nations Security Council, 2005).

**Outlook.**—The production of rough diamond in Africa is expected to decrease by 9% by 2011 because of the worldwide financial crisis, and then to increase by an average of between 3% and 4% per year from 2011 to 2015. Angola's production is likely to more than double because of the opening of new mines and increased output from existing mines. In Tanzania, the Williamson Mine is likely to close in 2010 and reopen at higher levels of production in 2013. Production could also increase in Zimbabwe by 2011. In South Africa, reduced production at the Namaqualand and the Venetia Mines is expected to more than offset increased production from the Cullinan and the Voorspoed Mines. Production is also likely to decrease at the De Beers Group's operations in Botswana (table 19).

**Lithium.**—**Production.**—Zimbabwe was Africa's only producer of lithium minerals. In 2008, production decreased by about 17% (table 20).

**Outlook.**—No change is expected in Zimbabwe's lithium mineral production from 2008 to 2015 (table 20).

### **Mineral Fuels and Related Materials**

**Coal.**—**Production.**—African coal production increased by nearly 2% in 2008. In South Africa, increased output was

partially attributable to increased production at the Leeuwpan Mine and the North Block Complex and the opening of the Inyanda Mine. Output increased in Botswana and decreased in Zimbabwe. South Africa, which was the dominant coal producer in Africa, accounted for 98% of regional coal output; and Zimbabwe, 1% (table 21). More than 99% of South Africa's coal production was bituminous. Africa accounted for about 5% of total world anthracite and bituminous coal production in 2008.

**Consumption.**—Africa accounted for about 3% of world coal consumption in 2008. Within the region, South Africa accounted for 92% of African coal consumption. From 2003 to 2008, Africa's consumption of coal increased by about 15% (BP p.l.c., 2009, p. 35).

**Outlook.**—African coal production is expected to increase by between 5% and 6% per year from 2008 to 2015. South Africa is likely to be responsible for the majority of the increase; its production could increase to 349 Mt by 2015 (table 21). Increased output would be attributable to the opening of the Makhado, the Mooiplaats, and the Vele Mines in 2009; the Boshmanspoort Mine in 2010; the New Largo and the Vlakfontein Mines in 2012; the Elders Opencast, the Elders Underground, and the Heidelberg Underground Mines in 2013; and the Thabametsi Mine in 2014, and to the expansions of the Forzando South Mine in 2009; the Klipspruit Mine in 2010; the Goedgevonden Mine in 2011; and the Grootegeluk Mine from 2011 to 2015 (table 21; Cornish, 2009; Ruffini, 2009; Tex Report, The, 2009; Ryan, 2010; Thomson Reuters, 2010; Continental Coal Ltd., undated).

Mozambique is expected to become the second ranked coal producer in Africa with the opening of the Benga and the Moatize Mines in late 2010. Tanzania is likely to become the fourth ranked producer with the opening of the Ngaka Mine in late 2011. In Zimbabwe, output could increase at Hwange Colliery by 2013 if economic and political stability are restored (table 21; Theunissen, 2009).

**Uranium.**—**Production.**—In 2008, African uranium mine production increased by 16% compared with that of 2007. In Namibia, output increased at the Langer Heinrich and the Rossing Mines. The increase in South Africa's production was limited by the closure of the Dominion Mine in late 2008. Output decreased in Niger. In 2008, Namibia accounted for 55% of African uranium production; Niger, 38%; and South Africa, 7% (table 22). Africa accounted for about 19% of the world's uranium production in 2008 (table 4).

**Consumption.**—South Africa was the only regional consumer of uranium in 2008. Africa accounted for less than 1% of the electricity generated worldwide by nuclear power (BP p.l.c., 2009, p. 36).

**Outlook.**—Continental uranium mine production is expected to increase by about 280% from 2008 to 2015. In Niger, the new Imouraren Mine is likely to open in 2012. Niger's share of African uranium mine production is likely to decrease to 27% from 38% in spite of nearly tripling from 2008 to 2015 because of increased output in other African countries (table 22).

In Namibia, production at the Langer Heinrich and the Rossing Mines is planned to increase by 2011 and 2013, respectively. The new Trekkopje Mine is likely to open by 2011; the Valencia Mine, by 2013; and the Husab Mine, by

2015. In South Africa, the Ezulwini Mine is expected to start production in 2011; the Buffelsfontein Tailings Project, in 2012; and the Cooke Uranium project, in 2013. AngloGold Ashanti Ltd. planned to increase uranium output from its South African gold mines by about 36% by 2010. The Kayelekera Mine in Malawi is expected to reach full capacity in 2010 after starting operations in 2009, and the Kanyika niobium mine could start uranium production in early 2013. Africa's share of world uranium mine production could increase significantly by 2015 [table 22; Rand Uranium (Pty) Ltd., 2010].

## Trade Review and Outlook

Africa's current account surplus amounted to 2.5% of the GDP in 2008 compared with a revised 2.9% of the GDP in 2007. In 2008, countries in the Arab Maghreb Union ran an average surplus of 10.6% of the GDP, and sub-Saharan countries ran an average surplus of 0.2% of the GDP. Trade surpluses in oil-exporting countries more than offset trade deficits in oil-importing countries. Oil-importing countries had an average current account deficit of 7.1% of the GDP in 2008, and oil-exporting countries had an average current account surplus of 14.9% of the GDP (International Monetary Fund, 2009, p. 90).

The average current account deficit for oil-importing countries is expected to be 5.7% of the GDP in 2009 and 7.3% of the GDP in 2010. For oil-exporting countries, the surplus is predicted to be 0.9% of the GDP in 2009 and 6.2% of the GDP in 2010. Africa is expected to run a current account deficit of 3.1% of the GDP in 2009 and 1.7% of the GDP in 2010 (International Monetary Fund, 2009, p. 90).

Africa's natural gas exporters included Algeria, which accounted for 51% of the continent's natural gas exports; Nigeria, 18%; Libya, 15%; Egypt, 9%; and Equatorial Guinea, 4%. Europe received 75% of African total natural gas exports and was the destination for 85% of Africa's natural gas exports by pipeline and 66% of Africa's liquefied natural gas (LNG) exports. Countries of the Asia and the Pacific region received 15% of total African natural gas exports; intraregional exports to other Africa countries accounted for only 4% (BP p.l.c., 2009, p. 30).

In 2008, Europe received 37% of Africa's petroleum exports; the United States, 30%; China, 13%; India, 5%; and other countries in the Asia and the Pacific region, 4%. West African countries sent 40% of their exports to the United States and 28% to China, India, and other countries in the Asia and the Pacific region. North African countries sent 63% of their exports to Europe and 20% to the United States. Intraregional exports to African countries amounted to only 1% of total African petroleum exports (BP p.l.c., 2009, p. 20).

Intraregional mineral trade was, however, significant for gold. South Africa imported gold, mostly from West African countries, to supply its gold refinery. A majority of African gold mine production was refined in South Africa before being exported to other regions. Most of Africa's copper and PGM production was also exported in refined form. The majority of Africa's chromite production was processed into ferrochromium prior to export. For other commodities, which included bauxite, colored gemstones, diamond, iron ore, niobium (columbium), petroleum, tantalum, tin, tungsten, and uranium, most of or all

of the continent's production was exported prior to downstream processing.

## Environment

Deforestation for fuel use and land-intensive agricultural production continued to be a significant environmental issue in many African countries. Other causes of deforestation included artisanal production of gemstones, lime, and sand and gravel. 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 flaring of natural gas in Nigeria has led to air pollution and emissions of greenhouse gases.

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TABLE 1  
AFRICA: AREA AND POPULATION IN 2008

Country	Area <sup>1</sup> (square kilometers)	Estimated population <sup>2</sup> (thousands)
Algeria	2,381,741	34,362
Angola	1,246,700	18,021
Benin	112,622	8,662
Botswana	581,730	1,905
Burkina Faso	274,200	15,209
Burundi	27,830	8,074
Cameroon	475,440	18,898
Cape Verde	4,033	499
Central African Republic	622,984	4,423
Chad	1,284,000	11,067
Comoros	2,235	644
Congo (Brazzaville)	342,000	3,615
Congo (Kinshasha)	2,344,858	64,205
Côte d'Ivoire	322,463	20,591
Djibouti	23,200	848
Egypt	1,001,450	81,527
Equatorial Guinea	28,051	659
Eritrea	117,600	4,996
Ethiopia	1,104,300	80,713
Gabon	267,667	1,448
Gambia, The	11,295	1,660
Ghana	238,533	23,351
Guinea	245,857	9,833
Guinea-Bissau	36,125	1,575
Kenya	580,367	38,534
Lesotho	30,355	2,017
Liberia	111,369	3,793
Libya	1,759,540	6,277
Madagascar	587,041	19,111
Malawi	118,484	14,278
Mali	1,240,192	12,711
Mauritania	1,030,700	3,200
Mauritius	2,040	1,269
Mayotte	374	191
Morocco	446,550	31,229
Mozambique	799,380	21,781
Namibia	824,292	2,114
Niger	1,267,000	14,669
Nigeria	923,768	151,319
Reunion	2,517	NA
Rwanda	26,338	9,721
Sao Tome e Principe	964	161
Senegal	196,722	12,211
Seychelles	455	86
Sierra Leone	71,740	5,560
Somalia	637,657	8,954
South Africa	1,219,090	48,687
Sudan	2,505,813	41,348
Swaziland	17,364	1,168
Tanzania	947,300	42,484
Togo	56,785	6,459
Tunisia	163,610	10,327
Uganda	241,038	31,657

See footnotes at end of table.

TABLE 1—Continued  
AFRICA: AREA AND POPULATION IN 2008

Country	Area <sup>1</sup> (square kilometers)	Estimated population <sup>2</sup> (thousands)
Western Sahara	266,000	405
Zambia	752,618	12,620
Zimbabwe	390,757	12,463
Total	30,288,134	983,589
World	148,940,000	6,692,030

NA Not available.

<sup>1</sup>Source: Central Intelligence Agency, The World Factbook 2009.

<sup>2</sup>Source: The World Bank, 2008 World Development Indicators Database.

TABLE 2  
AFRICA: GROSS DOMESTIC PRODUCT<sup>1,2</sup>

Country	Gross domestic product based on purchasing power parity		Real gross domestic product growth rate (percentage)		
	Gross value	Per capita	2006	2007	2008
	(billion dollars)	(dollars)			
Algeria	\$233.4	\$6,709	2.0	3.0	3.0
Angola	105.1	6,252	18.6	20.3	13.2
Benin	13.0	1,608	3.8	4.6	5.0
Botswana	26.6	14,907	5.1	4.4	2.9
Burkina Faso	17.8	1,268	5.5	3.6	5.0
Burundi	3.1	390	5.1	3.6	4.5
Cameroon	41.5	2,139	3.2	3.3	2.9
Cape Verde	1.7	3,472	10.8	7.8	5.9
Central African Republic	3.2	740	3.8	3.7	2.2
Chad	16.2	1,663	0.2	0.2	-0.2
Comoros	0.8	1,157	1.2	0.5	1.0
Congo (Brazzaville)	14.3	3,919	6.2	-1.6	5.6
Congo (Kinshasha)	20.7	330	5.6	6.3	6.2
Côte d'Ivoire	34.1	1,643	0.7	1.6	2.3
Djibouti	1.9	2,396	4.8	5.1	5.8
Egypt	443.4	5,897	6.8	7.1	7.2
Equatorial Guinea	22.4	18,058	1.3	21.4	11.3
Eritrea	3.7	748	-1.0	1.3	1.0
Ethiopia	71.1	898	11.5	11.5	11.6
Gabon	21.1	14,545	1.2	5.6	2.3
Gambia, The	2.3	1,395	6.5	6.3	6.1
Ghana	34.2	1,518	6.4	5.7	7.3
Guinea	10.4	1,014	2.5	1.8	4.9
Guinea-Bissau	0.8	486	0.6	2.7	3.3
Kenya	60.4	1,712	6.4	7.1	1.7
Lesotho	3.2	1,305	8.1	5.1	3.5
Liberia	1.5	373	7.8	9.4	7.1
Libya	88.1	14,192	6.7	7.5	3.4
Madagascar	20.1	996	5.0	6.2	7.1
Malawi	11.4	836	6.7	8.6	9.7
Mali	15.1	1,129	5.3	4.3	5.1
Mauritania	6.2	2,055	11.4	1.0	2.2
Mauritius	15.3	12,011	3.5	4.2	6.6
Mayotte	1.0 <sup>3,4</sup>	4,900 <sup>3,4</sup>	NA	NA	NA
Morocco	137.1	4,362	7.8	2.7	5.6
Mozambique	18.7	903	8.7	7.0	6.8
Namibia	13.7	6,612	7.1	5.5	2.9
Niger	10.2	740	5.8	3.3	9.5
Nigeria	319.6	2,162	6.2	7.0	6.0
Reunion	NA	NA	NA	NA	NA
Rwanda	10.0	1,043	7.3	7.9	11.2
Sao Tome e Principe	0.3	1,752	6.7	6.0	5.8
Senegal	21.8	1,739	2.4	4.7	2.5
Seychelles	1.8	20,829	8.3	7.3	-1.9
Sierra Leone	4.3	725.0	5.1	6.4	5.5
Somalia	5.6 <sup>3</sup>	600.0 <sup>3</sup>	2.6	2.6	2.6
South Africa	493.5	10,136.0	5.3	5.1	3.1
Sudan	88.0	2,309.1	11.3	10.2	6.8
Swaziland	5.9	5,749.3	2.9	3.5	2.4
Tanzania	53.8	1,353.5	6.7	7.1	7.4
Togo	5.4	811.5	3.9	1.9	1.1
Tunisia	82.6	8,002.2	5.4	6.3	4.6
Uganda	36.7	1,146.8	10.8	8.4	9.0

See footnotes at end of table.

TABLE 2—Continued  
AFRICA: GROSS DOMESTIC PRODUCT<sup>1,2</sup>

Country	Gross domestic product based on purchasing power parity		Real gross domestic product growth rate (percentage)		
	Gross value	Per capita	2006	2007	2008
	(billion dollars)	(dollars)			
Western Sahara	0.9 <sup>3,5</sup>	2,500.0 <sup>3,5</sup>	NA	NA	NA
Zambia	17.4	1,482.2	6.2	6.3	5.8
Zimbabwe	2.2 <sup>5</sup>	189.0 <sup>5</sup>	-6.3	-6.9	-14.1
Total	2,461.3	2,500			
World total	69,489,850				

NA Not available.

<sup>1</sup>Source: International Monetary Fund, World Economic Outlook Database, October 2009.

<sup>2</sup>Gross domestic product listed may differ from that reported in individual country chapters owing to differences in source or date of reporting.

<sup>3</sup>Source: U.S. Central Intelligence Agency, The World Factbook 2009.

<sup>4</sup>2005 estimate.

<sup>5</sup>2007 estimate.

TABLE 3  
SELECTED SIGNIFICANT AFRICAN EXPLORATION SITES IN 2008

Country	Type <sup>1</sup>	Site	Commodity <sup>2</sup>	Company	Resource <sup>2,3</sup>	Exploration <sup>4</sup>
Burkina Faso	E	Bombore	Au	Orezone Resource Ltd.	937,000 oz Au	Extensive drilling.
Cameroun	E	Mbalam	Fe	Sundance Resources Ltd.	134 Mt Fe (inferred)	Do.
Congo (Kinshasa)	E	Kasala	Cu	El Nino Ventures Inc.	Data not released	Do.
Do.	F	Moto	Au	Moto Goldmines Ltd.	11.2 Moz Au	Extensive work program.
Do.	D	Tenke Fungurume	Cu, Co	Freeport McMoRan Copper & Gold Inc.	2.3 Mt Cu, 357,000 t Co	Do.
Do.	F	Twangiza	Au	Banro Corp.	5.6 Moz Au	Do.
Côte d'Ivoire	E	Tengrela	Au	Perseus Mining Ltd.	388,000 oz Au	Extensive drilling.
Egypt	D	Sukari	Au	Centramin Egypt Ltd.	9.4 Moz Au	Do.
Ghana	F	Ayanfuri	Au	Perseus Mining Ltd.	3.15 Moz Au	Do.
Do.	E	Sian	Au	Midlands Minerals Corp.	192,000 oz Au	Do.
Guinea	E	Koba	Bauxite	Navasota Resource Ltd.	147 Mt Al <sub>2</sub> O <sub>3</sub>	Do.
Mauritania	P	Tasiast	Au	Red Back Mining Inc.	1.95 Moz Au	Do.
Namibia	E	Entango	U	Bannerman Resource Ltd.	40,500 t U <sub>3</sub> O <sub>8</sub>	Do.
Do.	E	Husab/Ida Dome	U	Extract Resources Ltd.	150 t U <sub>3</sub> O <sub>8</sub>	Do.
Do.	E	Husab/Rossing South	U	do.	49,000 t U <sub>3</sub> O <sub>8</sub>	Do.
Do.	P	Navachab	Au	AngloGold Ashanti Ltd.	1.3 Moz Au	Extensive work program.
Do.	E	Reptile	U	Deep Yellow Ltd.	Data not released	Extensive drilling.
South Africa	E	Garatau/Tubatse	PGM, Au	Nkwe Platinum Ltd.	2.7 Moz 3PGM+Au	Do.
Do.	F	Mphahlele	PGM, Au	Platmin Ltd.	6.6 Moz 5PGM+Au	Extensive work program.
Tanzania	E	Buckreef	Au	IAMGOLD Corp.	1 Moz Au	Do.
Do.	E	Kabanga	Ni, Cu, Co, PGM	Barrick Gold Corp.	219,000 t Ni, 30,000 t Cu, 18,000 t Co	Extensive drilling.
Zambia	E	Cheowa/Kangaluwi	Cu, Au	Zambezi Resources Ltd.	40,000 t Cu, 26,000 oz Au	Do.
Do.	F	Konkola North	Cu	Teal Exploration & Mining Inc.	1.2 Mt Cu	Do.
Do.	F	Mutanga	U	Denison Mines Corp.	2,500 t U <sub>3</sub> O <sub>8</sub>	Do.

Do., do. Ditto.

<sup>1</sup>D—Approved for development; E—Active exploration; F—Feasibility work ongoing/completed; P—Exploration related to existing producing operation.

<sup>2</sup>Abbreviations used in this table for commodities include the following: Al<sub>2</sub>O<sub>3</sub>, aluminum oxide; Au, gold; Co, cobalt; Cu, copper; Fe, iron; Ni, nickel; PGM, platinum-group metals; 3PGM+Au, Includes palladium, platinum, rhodium, and gold; 5PGM+Au, Includes palladium, platinum, rhodium, iridium, and gold; U, uranium; U<sub>3</sub>O<sub>8</sub>, uranium oxide.

Abbreviations used in this table for units of measure include the following: Moz, million troy ounces; Mt, million metric tons; oz, troy ounces; t, metric tons.

<sup>3</sup>Based on 2008 data reported from various sources, values vary from measured reserves to identified resources. Resources are reported at the indicated level unless otherwise specified. Resource data not verified by the U.S. Geological Survey.

<sup>4</sup>Sites where extensive (greater than 10,000 meters) drilling or significant (more than US\$5 million) expenditures have been reported.

TABLE 4  
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2008<sup>1</sup>  
(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 (metric tons)	Manganese ore, mine output, Mn content	
	Bauxite	Metal <sup>2</sup>					Iron ore, gross weight	Steel, crude			
Algeria	--	--	--	--	--	647	2,077	646	--	--	
Angola	--	--	--	--	--	--	--	--	--	--	
Benin	--	--	--	--	--	20	--	--	--	--	
Botswana	--	--	--	22 <sup>e</sup>	--	3,176	--	--	--	--	
Burkina Faso	--	--	--	--	--	7,633 <sup>3</sup>	--	--	--	--	
Burundi	--	--	--	--	--	750	--	--	--	--	
Cameroon	--	91 <sup>e</sup>	--	--	--	1,800 <sup>e</sup>	--	--	--	--	
Cape Verde	--	--	--	--	--	--	--	--	--	--	
Central African Republic	--	--	--	--	--	10 <sup>e</sup>	--	--	--	--	
Chad	--	--	--	--	--	150 <sup>e</sup>	--	--	--	--	
Comoros	--	--	--	--	--	--	--	--	--	--	
Congo (Brazzaville)	--	--	--	--	--	100 <sup>e</sup>	--	--	--	--	
Congo (Kinshasa)	--	--	--	31,000 <sup>e</sup>	243 <sup>e</sup>	3,300 <sup>e</sup>	--	113	--	--	
Côte d'Ivoire	--	--	--	--	--	4,205	--	--	--	76	
Djibouti	--	--	--	--	--	--	--	--	--	--	
Egypt	--	260	--	--	--	--	1,811	6,198	--	3	
Equatorial Guinea	--	--	--	--	--	200 <sup>e</sup>	--	--	--	--	
Eritrea	--	--	--	--	--	32	--	--	--	--	
Ethiopia	--	--	--	--	--	3,465	--	110 <sup>e</sup>	--	--	
Gabon	--	--	--	--	--	300 <sup>e</sup>	--	--	--	1,549	
Gambia, The	--	--	--	--	--	--	--	--	--	--	
Ghana	738	--	--	--	--	80,503	--	--	--	380 <sup>e</sup>	
Guinea	17,200	--	--	--	--	19,945 <sup>4</sup>	--	--	--	--	
Guinea-Bissau	--	--	--	--	--	--	--	--	--	--	
Kenya	--	2 <sup>e</sup>	--	--	--	340	(5) <sup>e</sup>	--	--	--	
Lesotho	--	--	--	--	--	--	--	--	--	--	
Liberia	--	--	--	--	--	624	--	--	--	--	
Libya	--	--	--	--	--	--	--	1,137	--	--	
Madagascar	--	--	84	--	--	72	--	--	--	--	
Malawi	--	--	--	--	--	--	--	--	--	--	
Mali	--	--	--	--	--	41,160	--	--	--	--	
Mauritania	--	--	--	--	33	6,254	10,950	1,598	--	--	
Mauritius	--	--	--	--	--	--	--	--	--	--	
Morocco and Western Sahara	--	--	--	1,000 <sup>e</sup>	6 <sup>e</sup>	1,600 <sup>e</sup>	9 <sup>e</sup>	478	33,500 <sup>e</sup>	3 <sup>e</sup>	
Mozambique	5 <sup>e</sup>	536	--	--	--	298	--	--	--	--	

See footnotes at end of table.

TABLE 4—Continued  
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2008<sup>1</sup>  
(Thousand metric tons unless otherwise specified)

Country	Metals—Continued										
	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 (metric tons)	Manganese ore, mine output, Mn content	
	Bauxite	Metal <sup>2</sup>					Iron ore, gross weight	Steel, crude			
Namibia	--	--	--	--	7	2,126	--	14,062	10 <sup>e</sup>		
Niger	--	--	--	--	--	2,314	--	--	--		
Nigeria	--	20	--	--	--	200 <sup>e</sup>	62	500 <sup>e</sup>	57,960		
Reunion	--	--	--	--	--	--	--	--	--		
Rwanda	--	--	--	--	--	20 <sup>e</sup>	--	--	--		
Sao Tome e Principe	--	--	--	--	--	--	--	--	--		
Senegal	--	--	--	--	--	600 <sup>e</sup>	--	--	--		
Seychelles	--	--	--	--	--	--	--	--	--		
Sierra Leone	954	--	--	--	--	196	--	--	--		
Somalia	--	--	--	--	--	--	--	--	--		
South Africa	--	811	9,682	400 <sup>e</sup>	109	212,744	48,983	8,550	46,440		
Sudan	--	--	15 <sup>e</sup>	--	--	2,276	--	--	2,900		
Swaziland	--	--	--	--	--	--	--	--	(5)		
Tanzania	5 <sup>e</sup>	--	--	--	3 <sup>e</sup>	36,000 <sup>e</sup>	--	--	--		
Togo	--	--	--	--	--	--	--	--	--		
Tunisia	--	--	--	--	--	--	211	82	--		
Uganda	--	--	--	--	--	20 <sup>e</sup>	(5) <sup>e</sup>	30 <sup>e</sup>	--		
Zambia <sup>e</sup>	--	--	--	6,900	583	1,930	--	--	1		
Zimbabwe	--	--	650 <sup>e</sup>	50 <sup>e</sup>	2 <sup>e</sup>	3,600 <sup>e</sup>	50 <sup>e</sup>	60 <sup>e</sup>	--		
Total	18,900	1,720	10,400	39,400	1,010	439,000	64,200	19,500	152,000		
Share of world total	9%	4%	37%	52%	6%	22%	3%	1%	4%		
United States	NA	2,660	--	--	1,310	233,000	53,600	91,900	410,000		
Share of world total	NA	6%	--	--	8%	12%	2%	7%	10%		
World total	213,000	47,400	28,000	75,000	15,500	1,970,000	2,210,000	1,330,000	3,970,000		

See footnotes at end of table.



TABLE 4—Continued  
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2008<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Country	Metals—Continued		Industrial minerals				Mineral fuels	
	Zinc, mine output, Zn content (metric tons)	Cement, hydraulic (thousand carats) <sup>6</sup>	Diamond, natural (thousand carats) <sup>6</sup>	Graphite (metric tons)	Phosphate rock, gross weight	Coal, anthracite and bituminous	Petroleum, crude (thousand 42-gallon barrels)	Uranium, U <sub>3</sub> O <sub>8</sub> content (metric tons)
Algeria	--	17,397	--	--	1,805	--	727,445	--
Angola	--	1,780	8,907 <sup>7,8</sup>	--	--	--	684,375	--
Benin	--	1,500	--	--	--	--	--	--
Botswana	--	--	32,595 <sup>9</sup>	--	--	910	--	--
Burkina Faso	--	30 <sup>e</sup>	--	--	2 <sup>e</sup>	--	--	--
Burundi	--	--	--	--	--	--	--	--
Cameroon	--	1,000	12 <sup>e</sup>	--	--	--	31,000 <sup>e</sup>	--
Cape Verde	--	160 <sup>e</sup>	--	--	--	--	--	--
Central African Republic	--	--	377	--	--	--	--	--
Chad	--	--	--	--	--	--	49,400 <sup>e</sup>	--
Comoros	--	--	--	--	--	--	--	--
Congo (Brazzaville)	--	100 <sup>e</sup>	110	--	--	--	85,037	--
Congo (Kinshasa)	18,000	411 <sup>e</sup>	20,947	--	--	116	8,000	--
Côte d'Ivoire	--	650 <sup>e</sup>	300 <sup>e</sup>	--	--	--	22,000 <sup>e</sup>	--
Djibouti	--	--	--	--	--	--	--	--
Egypt	--	39,844	--	--	5,523	360 <sup>e</sup>	240,990	--
Equatorial Guinea	--	--	--	--	--	--	120,000 <sup>e</sup>	--
Eritrea	--	45 <sup>e</sup>	--	--	--	--	--	--
Ethiopia	--	1,834	--	--	--	--	--	--
Gabon	--	230	1 <sup>e</sup>	--	--	--	85,775	--
Gambia, The	--	--	--	--	--	--	--	--
Ghana	--	1,800 <sup>e</sup>	643	--	--	--	--	--
Guinea	--	360 <sup>e</sup>	3,098	--	--	--	--	--
Guinea-Bissau	--	--	--	--	--	--	--	--
Kenya	--	3,135	--	--	--	--	--	--
Lesotho	--	--	450 <sup>e</sup>	--	--	--	--	--
Liberia	--	94 <sup>p</sup>	61	--	--	--	--	--
Libya	--	8,000 <sup>e</sup>	--	--	--	--	643,600	--
Madagascar	--	460	--	5,000 <sup>e</sup>	--	--	14 <sup>e</sup>	--
Malawi	--	240	--	--	--	60 <sup>e</sup>	--	--
Mali	--	--	--	--	--	--	--	--
Mauritania	--	322	--	--	--	--	4,422	--
Mauritius	--	--	--	--	--	--	--	--
Morocco and Western Sahara	96,900 <sup>e</sup>	14,047	--	--	25,000 <sup>e</sup>	--	250 <sup>e</sup>	--
Mozambique	--	730 <sup>e</sup>	--	--	--	38 <sup>e</sup>	--	--

See footnotes at end of table.

TABLE 4—Continued  
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2008<sup>1</sup>  
(Thousand metric tons unless otherwise specified)

Country	Metals— Continued		Industrial minerals				Mineral fuels		
	Zinc, mine output, Zn content (metric tons)		Cement, hydraulic (thousand carats) <sup>6</sup>	Diamond, natural	Graphite (metric tons)	Phosphate rock, gross weight	Coal, anthracite and bituminous	Petroleum, crude (thousand 42- gallon barrels)	Uranium, U <sub>3</sub> O <sub>8</sub> content (metric tons)
Namibia	38,319 <sup>e</sup>	--	--	2,435	--	--	--	--	5,074
Niger	--	40 <sup>e</sup>	--	--	--	--	183	--	3,575
Nigeria	--	5,000 <sup>e</sup>	--	--	--	--	500 <sup>e</sup>	768,800	--
Reunion	--	400 <sup>e</sup>	--	--	--	--	--	--	--
Rwanda	--	103	--	--	--	--	--	--	--
Sao Tome e Principe	--	--	--	--	--	--	--	--	--
Senegal	--	3,084	--	--	--	645	--	99	--
Seychelles	--	--	--	--	--	--	--	--	--
Sierra Leone	--	254	--	371	--	--	--	--	--
Somalia	--	--	--	--	--	--	--	--	--
South Africa	29,002	13,323	12,901	--	--	2,287	252,213	1,976	654
Sudan	--	330 <sup>e</sup>	--	--	--	--	--	168,898	--
Swaziland	--	--	--	--	--	--	175	--	--
Tanzania	--	1,756	180 <sup>e,10</sup>	--	--	8 <sup>e</sup>	27 <sup>e</sup>	--	--
Togo	--	800 <sup>e</sup>	9	--	--	842	--	--	--
Tunisia	--	7,875	--	--	--	7,692	--	31,732	--
Uganda	--	650 <sup>e</sup>	--	--	--	--	--	--	--
Zambia <sup>e</sup>	--	700	--	--	--	--	220	--	--
Zimbabwe	--	400 <sup>e</sup>	797	--	2,000 <sup>e</sup>	30 <sup>e</sup>	2,000 <sup>e</sup>	--	--
Total	182,000	129,000	84,200	7,000	43,800	257,000	3,670,000	9,300	
Share of world total	2%	5%	55%	1%	27%	5%	12%	19%	
United States	778,000	87,600	--	--	30,200	994,000	6,620,000	1,770	
Share of world total	7%	3%	--	--	18%	17%	22%	4%	
World total	11,300,000	2,840,000	153,000	1,110,000	165,000	5,680,000	30,200,000	49,400	

<sup>e</sup>Estimated; estimated data. U.S. data, and world totals are rounded to no more than three significant digits. <sup>f</sup>Preliminary. NA Not available. -- Zero or zero percent.

<sup>1</sup>Totals may not add owing to independent rounding. Percentages are calculated on unrounded data. Table includes data available through June 21, 2010.

<sup>2</sup>Primary and secondary production.

<sup>3</sup>Includes artisanal mining, which was estimated to be 1,600 kilograms.

<sup>4</sup>Does not include artisanal mining production, which has historically ranged between 1,500 and 5,000 kilograms per year.

<sup>5</sup>Less than 1/2 unit.

<sup>6</sup>Gemstones and industrial diamond.

<sup>7</sup>Does not include smuggled production.

<sup>8</sup>Production was approximately 90% gem and 10% industrial grade.

<sup>9</sup>Assumed to contain about 70% gem and near gem.

<sup>10</sup>Diamond figures are estimated to represent 85% gem-quality or semigem-quality and 15% industrial-quality stones. Does not include smuggled artisanal production.

TABLE 5  
AFRICA: HISTORIC AND PROJECTED BAUXITE PRODUCTION, 1995-2015<sup>1</sup>

(Thousand metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Ghana	513	504	727	738	800	850	850
Guinea	15,800	15,700	14,600	17,200	17,200	17,200	17,200
Mozambique	11	8	10	5	5	5	5
Sierra Leone	--	--	--	954	960	960	960
Tanzania	--	--	2	5	5	5	5
Total	16,300	16,200	15,300	18,900	19,000	19,000	19,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

TABLE 6  
AFRICA: HISTORIC AND PROJECTED ALUMINUM PRODUCTION, 1995-2015<sup>1</sup>

(Thousand metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Cameroon	79	86	87	91	90	90	90
Egypt	180	189	244	260	320	320	320
Ghana	135	137	--	--	--	120	200
Kenya <sup>2</sup>	2	2	2	2	2	2	2
Mozambique	--	54	555	536	550	550	550
Nigeria	--	--	--	20	22	197	197
South Africa	229	673	846	811	810	810	810
Total	630	1,100	1,700	1,700	1,800	2,100	2,200

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

<sup>2</sup>Kenya produced secondary refined aluminum; primary production in all other African aluminum-producing countries.

TABLE 7  
AFRICA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 1995-2015<sup>1</sup>

(Metal content in thousand metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Botswana	25	35	31	22	24	28	30
Congo (Kinshasa)	29	31	97	243	583	645	762
Eritrea	--	--	--	--	--	81	73
Mauritania	--	--	--	33	30	30	30
Morocco	14	7	4	6	6	6	6
Namibia	23	6	10	7	--	--	--
South Africa	166	137	89	109	113	116	117
Tanzania <sup>2</sup>	--	--	4	3	7	7	7
Zambia	316	249	447	583	800	800	800
Zimbabwe	9	2	3	2	2	2	2
Total	580	470	690	1,000	1,600	1,700	1,800

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

<sup>2</sup>Copper contained in concentrates and doré.

TABLE 8  
AFRICA: HISTORIC AND PROJECTED REFINED COPPER PRODUCTION, 1995-2015<sup>1</sup>

(Thousand metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Congo (Kinshasa)	35	--	--	46	408	490	655
Egypt <sup>2</sup>	4	4	14	12	12	12	12
South Africa	124	126	99	93	90	91	91
Zambia	328	227	399	400	500	500	500
Zimbabwe	7	10	7	3	7	7	7
Total	500	370	520	550	1,000	1,100	1,300

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

<sup>2</sup>Egypt produced secondary refined copper; primary production in all other African countries.

TABLE 9  
AFRICA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 1995-2015<sup>1</sup>

(Metal content in kilograms)

Country	1995	2000	2005	2008	2011 <sup>c</sup>	2013 <sup>c</sup>	2015 <sup>c</sup>
Algeria	--	--	637	647	1,100	1,100	1,100
Benin <sup>2</sup>	300	--	20	20	20	20	20
Botswana	86	4	2,709	3,176	1,700	1,700	--
Burkina Faso	1,319	625	1,397	7,633	8,700	9,400	9,400
Burundi	2,000	--	750	750	750	750	750
Cameroon <sup>2</sup>	800	1,000	1,889	1,800	3,000	3,000	3,000
Central African Republic	97	15	15	10	4,100	6,900	6,300
Chad	--	120	150	150	50	50	50
Congo (Brazzaville)	10	10	120	100	100	100	100
Congo (Kinshasa)	1,180	69	7,200	3,300	3,400	18,600	32,000
Côte d'Ivoire	1,983	3,444	1,335	4,205	12,100	15,700	15,100
Egypt	--	--	--	--	6,200	6,200	6,200
Equatorial Guinea	50	500	200	200	200	200	200
Eritrea	59	264	25	32	34	34	30
Ethiopia	4,500	3,206	4,376	3,465	4,900	7,100	5,700
Gabon	70	70	300	300	300	300	300
Ghana	53,087	72,080	66,852	80,503	85,100	88,200	88,200
Guinea	7,863	15,788	25,097	19,945	18,500	18,500	18,500
Kenya	170	1,243	616	340	340	340	340
Liberia	800	25	27	624	650	650	650
Madagascar	38	5	10	72	70	70	70
Mali	3,996	28,717	44,230 <sup>3</sup>	41,160 <sup>4</sup>	42,100 <sup>4</sup>	43,000 <sup>4</sup>	43,000 <sup>4</sup>
Mauritania	1,196	--	--	6,254	10,500	10,500	10,500
Morocco	580	505	1,786	1,600	1,600	1,600	1,600
Mozambique	6,800	23	63	298	820	820	820
Namibia	2,394	2,417	2,703	2,126	2,200	2,200	2,200
Niger	1,000	25	4,962	2,314	2,300	2,300	2,300
Nigeria	5	52	30	200	200	200	200
Rwanda	26	10	10	20	20	20	20
Senegal	--	550	600	600	5,300	5,300	5,300
Sierra Leone	4	--	53	196	200	200	200
South Africa	523,809	430,800	294,671	212,744	239,000	257,000	274,000
Sudan	3,700	5,774	3,625	2,276	2,100	--	--
Tanzania	320	15,060	47,270	36,000	44,100	40,000	38,600
Uganda	1,506	56	46	20	20	20	20
Zambia	91	600	440	1,930	2,000	2,000	2,000
Zimbabwe	23,959	22,069	14,024	3,600	10,000	20,000	20,000
Total	644,000	605,000	528,000	439,000	514,000	560,000	590,000

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

<sup>2</sup>From artisanal mining.

<sup>3</sup>Excludes production from artisanal mining, which is estimated to be about 4,000 kilograms per year.

<sup>4</sup>Excludes production from artisanal mining, which is estimated to be about 5,000 kilograms per year.

TABLE 10  
AFRICA: HISTORIC AND PROJECTED IRON ORE MINE PRODUCTION, 1995-2015<sup>1</sup>

(Fe content in thousand metric tons)

Country	Average grade	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Algeria	50%	1,100	820	800	1,039	1,500	1,500	1,500
Egypt	55%	1,120	1,900	880	996	1,600	1,600	1,600
Gabon	64%	--	--	--	--	--	--	11,500
Mauritania	59% to 72%	7,000	7,500	7,000	7,120	8,000	8,500	8,500
Morocco	54%	32	4	4	5	5	4	4
Nigeria	36%	62	9	20	20	--	--	50
Senegal	42% to 59%	--	--	--	--	--	--	7,500
South Africa	62% to 65%	19,800	21,570	24,900	30,800	38,800	48,500	48,200
Tanzania	32%	14	--	--	--	--	--	--
Tunisia	54%	122	98	108	110	100	100	100
Uganda	61% to 67%	--	3	--	(3)	(3)	(3)	(3)
Zimbabwe <sup>2</sup>	51%	160	225	185	25	--	100	200
Total		29,400	32,100	34,600	40,100	50,000	60,300	79,200

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

<sup>2</sup>Average iron content for Zimbabwe prior to 1996 was 61%. Since 1996, the average grade has been 51%.

<sup>3</sup>Less than 1 unit.

TABLE 11  
AFRICA: HISTORIC AND PROJECTED STEEL PRODUCTION, 1995-2015<sup>1</sup>

(Thousand metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Algeria	827	842	1,007	646	1,500	1,500	1,500
Congo (Kinshasa)	NA	159	110	113	110	110	110
Egypt	2,642	2,838	5,565	6,198	8,000	8,000	8,000
Ethiopia	NA	NA	60	110	110	110	110
Kenya	20	--	--	--	--	--	--
Libya	909	1,055	1,255	1,137	2,000	2,000	2,000
Mauritania	NA	5	1,263	1,598	2,000	2,000	2,000
Morocco	7	5	205	478	500	500	500
Nigeria	36	--	100	500	500	500	1,200
South Africa	8,741	8,481	9,494	8,550	8,100	8,100	8,100
Tunisia	201	237	66	82	220	240	250
Uganda	12	7	30	30	30	30	30
Zimbabwe	210	258	107	60	60	200	400
Total	13,600	13,900	19,300	19,500	23,000	23,000	24,000

<sup>e</sup>Estimated. NA Not available. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

TABLE 12  
AFRICA: HISTORIC AND PROJECTED NICKEL MINE PRODUCTION, 1995-2015<sup>1</sup>

(Metal content in metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Botswana	18,088	38,420	39,305	28,940	28,000	28,000	28,000
Madagascar	--	--	--	--	20,000	60,000	60,000
Morocco	NA	84	99	80	80	80	80
South Africa	30,700	36,616	42,392	31,675	47,800	54,500	56,800
Zambia	--	--	--	--	6,000	6,000	9,000
Zimbabwe	11,721	8,160	8,556	6,354	8,000	8,000	5,000
Total	60,500	83,300	90,400	67,000	110,000	157,000	159,000

<sup>e</sup>Estimated. NA Not available. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

TABLE 13  
AFRICA: HISTORIC AND PROJECTED PLATINUM MINE PRODUCTION, 1995-2015<sup>1</sup>

(Metal content in kilograms)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Ethiopia	--	--	--	10	10	10	10
South Africa	102,300	114,459	163,711	146,141	157,000	170,000	181,000
Zimbabwe	7	505	4,834	5,642	8,000	10,000	10,000
Total	102,000	115,000	169,000	152,000	165,000	180,000	190,000

<sup>e</sup>Estimated. --Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

TABLE 14  
AFRICA: HISTORIC AND PROJECTED PALLADIUM MINE PRODUCTION, 1995-2015<sup>1</sup>

(Metal content in kilograms)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
South Africa	51,000	55,818	82,961	75,537	84,400	92,500	98,300
Zimbabwe	17	366	3,879	4,386	6,000	8,000	8,000
Total	51,000	56,200	86,800	79,900	90,400	100,000	106,000

<sup>e</sup>Estimated.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

TABLE 15  
AFRICA: HISTORIC AND PROJECTED TIN MINE PRODUCTION, 1995-2015<sup>1</sup>

(Metal content in metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Burundi	15	6	4	21	20	20	20
Congo (Kinshasa)	--	50	4,400	11,800	9,400	9,400	9,400
Egypt	--	--	--	--	1,530	1,530	1,530
Niger	20	22	14	10	10	10	10
Nigeria	250	2,760	1,300	185	200	200	200
Rwanda	242	276	170	1,100	1,200	1,200	2,600
Tanzania	3	--	--	--	--	--	--
Zimbabwe	10	--	--	--	--	--	--
Total	500	3,100	5,900	13,100	12,400	12,400	13,800

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

TABLE 16  
AFRICA: HISTORIC AND PROJECTED TIN METAL PRODUCTION, 1995-2015<sup>1</sup>

(Metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Nigeria	259	25	25	--	--	--	--
Rwanda	--	--	200	--	--	--	--
Total	260	25	230	--	--	--	--

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

TABLE 17  
AFRICA: HISTORIC AND PROJECTED ZINC MINE PRODUCTION, 1995-2015<sup>1</sup>

(Metal content in thousand metric tons)

Country <sup>2</sup>	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Algeria	7	10	4	--	106	106	106
Congo (Kinshasha)	5	--	8	18	13	13	13
Morocco	80	103	79	97	98	98	98
Namibia <sup>3</sup>	30	39	69	38	52	52	52
South Africa	70	64	32	29	30	44	44
Tunisia	44	41	16	--	--	--	--
Total	240	260	210	180	300	310	310

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

<sup>2</sup>In addition to the countries listed, Nigeria also mined a small quantity of zinc.

<sup>3</sup>Does not include zinc content of ore processed at Skorpion solvent extraction-electrowinning facility.



TABLE 18  
AFRICA: HISTORIC AND PROJECTED ZINC METAL PRODUCTION, 1995-2015<sup>1</sup>

(Thousand metric tons)

Country <sup>2</sup>	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Algeria	30	34	30	30	30	30	30
Namibia	--	--	133	145	150	150	150
South Africa	99	103	102	87	87	87	87
Total	130	140	270	260	270	270	270

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

<sup>2</sup>In addition to the countries listed, Nigeria also refined a small quantity of zinc.

TABLE 19  
AFRICA: HISTORIC AND PROJECTED DIAMOND MINE PRODUCTION, 1995-2015<sup>1</sup>

(Thousand carats)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Angola <sup>2,3</sup>	2,900	4,313	7,079	8,907	9,000	9,000	19,000
Botswana	16,802	24,635	31,890	32,595	28,000	28,000	28,000
Cameroon	NA	NA	12	12	12	12	12
Central African Republic	530	464	383	377	400	400	400
Congo (Brazzaville)	NA	50	--	110	150	150	150
Congo (Kinshasa)	22,024	16,006	35,207	20,947	21,000	21,000	21,000
Côte d'Ivoire	75	320	300	300	300	300	300
Gabon	1	1	(4)	(4)	(4)	(4)	(4)
Ghana	632	878	1,013	643	650	900	900
Guinea	365	327	549	3,098	3,100	3,100	3,100
Lesotho	NA	2	52	450	460	480	480
Liberia	150	170	NA	61	100	100	100
Namibia	1,382	1,552	1,902	2,435	2,400	2,400	2,400
Sierra Leone	214	77	669	371	400	400	400
South Africa	9,683	10,790	15,776	12,901	9,900	10,200	10,500
Tanzania	50	354	220	180	85	540	690
Togo	NA	NA	41	9	10	10	10
Zimbabwe	204	23	251	797	1,000	1,000	1,000
Total	55,000	60,000	95,300	84,200	77,000	78,000	88,000

<sup>e</sup>Estimated. NA Not available. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

<sup>2</sup>Does not include smuggled production.

<sup>3</sup>Production was about 90% gem grade and 10% industrial grade.

<sup>4</sup>Less than 1 unit.

TABLE 20  
AFRICA: HISTORIC AND PROJECTED LITHIUM PRODUCTION, 1995-2015

(Metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Zimbabwe	1,000	1,100	1,100	800	800	800	800

<sup>e</sup>Estimated data are rounded to no more than three significant digits.

TABLE 21  
AFRICA: HISTORIC AND PROJECTED SALABLE COAL PRODUCTION, 1995-2015<sup>1</sup>

(Thousand metric tons)

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Botswana	898	947	985	910	950	1,000	1,000
Congo (Kinshasa)	10	--	120	116	120	120	120
Egypt	10	39	300	360	360	360	360
Malawi	15	34	52	60	80	80	80
Morocco	650	31	<sup>(2)</sup>	--	--	--	--
Mozambique	40	16	3	38	16,300	16,300	16,300
Niger	135	158	182	183	180	180	180
Nigeria	29	12	8	500	500	500	500
South Africa	206,210	224,118	244,940	252,213	281,000	317,000	349,000
Swaziland	172	178	222	175	175	150	150
Tanzania	43	79	31	27	180	3,500	3,500
Zambia	141	168	240	220	200	300	300
Zimbabwe	5,538	3,809	2,891	2,000	2,000	4,000	4,000
Total	214,000	230,000	250,000	257,000	302,000	343,000	375,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

<sup>2</sup>Less than 1 unit.

TABLE 22  
AFRICA: HISTORIC AND PROJECTED URANIUM PRODUCTION, 1995-2015<sup>1</sup>

[Metal (U) content in metric tons]

Country	1995	2000	2005	2008	2011 <sup>e</sup>	2013 <sup>e</sup>	2015 <sup>e</sup>
Gabon	653	--	--	--	--	--	--
Malawi	--	--	--	--	1,300	1,400	1,400
Namibia	2,006	2,714	3,147	4,302	9,000	10,700	17,200
Niger	2,970	2,895	3,093	3,032	3,000	8,000	8,000
South Africa	1,443	861	674	554	840	2,200	2,300
Tanzania	--	--	--	--	--	960	960
Total	7,100	6,500	6,900	7,900	14,000	23,000	30,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits.

