



# 2005 Minerals Yearbook

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## AFRICA

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# THE MINERAL INDUSTRIES OF 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 30.4 million square kilometers, which is more than three times the size of the United States, and were home to 896 million people in 2005. 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, industrial diamond, phosphate rock, platinum-group metals (PGM), vermiculite, and zirconium.

The mineral industry was an important source of export earnings for many African nations in 2005. To promote exports, groups of African countries have formed numerous trade blocs, which included the Common Market for Eastern and Southern Africa, the Economic and Monetary Community of Central 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.

The U.S. Geological Survey (USGS) acknowledges and expresses its sincere appreciation to the following Government agencies, international institutions, and private research organizations for providing minerals production statistics, basic economic data, and mineral exploration and other mineral-related information:

For mineral production statistics—

- Algeria—Ministry of Energy and Mines,
- Botswana—Department of Mines,
- Burundi—Ministry of Energy and Mines,
- Cameroon—National Institute of Statistics,
- Côte d'Ivoire—Corporation for the Development of Mining,
- Eritrea—Department of Mines,
- Ethiopia—Ministry of Mines and Energy,
- Gambia—Geology Department,
- Kenya—Ministry of Environment and Natural Resources,
- Malawi—Department of Mines,
- Mauritius—Central Statistical Office,
- Morocco—Office Cherifien des Phosphates,
- Mozambique—National Directorate of Mines,
- Namibia—Ministry of Mines and Energy,
- Sierra Leone—Ministry of Mineral Resources,
- South Africa—Department of Minerals and Energy, Mineral Economics Directorate,
- Swaziland—Central Statistical Office,
- Tunisia—National Institute of Statistics,

- Uganda—Department of Geological Survey and Mines, and
- Zimbabwe—Chamber of Mines.

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

For minerals consumption data—

- British Petroleum plc,
- Department of Minerals and Energy of the Republic of South Africa,
- MEPS (International) Ltd., and
- U.S. Department of Energy in the United States.

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

## General Economic Conditions

In 2005, the real gross domestic product (GDP) of Africa grew by 5.4% after increasing by 5.5% in 2004. From 2000 to 2005, Africa's GDP grew at an average annual rate of about 4.7%. In 2005, the GDP increased by an average of 7.4% in African petroleum-exporting countries and by an average of 4.5% in African petroleum-importing countries. GDP growth in African petroleum-exporting countries was projected to be at or about 6.7% in 2006 and 9.1% in 2007. In petroleum-importing countries, GDP growth was expected to be at or about 4.8% in 2006 and 4.5% in 2007 (International Monetary Fund, 2006a, p. 65, 196).

## Investment Data and Political Risk

The Department of Minerals and Energy of the Republic of South Africa reported that investment in newly committed precious metals projects in South Africa (that is, those in which funds had already been committed or were being expended) was \$8.26 billion in 2005. An additional \$9.56 billion was reported for potential precious metals projects in South Africa (that is, feasibility-level projects for which funds had not yet been committed). PGM accounted for 69% of the investment, and gold, 31%. Potential investment in iron ore projects was at least \$950 million. Investment in newly committed processed minerals projects amounted to \$681 million, and potential processed minerals projects, \$584 million (Mwape and others, 2006, p. 21).

By 2008, capital expenditure for the heavy mineral sands project at Mandena in Madagascar was expected to total \$585 million; at Moma in Mozambique, \$348 million; and at Kwale in Kenya, \$178 million. By 2010, capital expenditures for bauxite and alumina in Guinea were likely to total more than \$2.35 billion; nickel in Madagascar, \$2.25 billion; and coal in Mozambique, \$1 billion. Substantial capital expenditures were also likely for aluminum in Mozambique and South Africa, cobalt and copper in the Democratic Republic of the Congo

[Congo (Kinshasa)] and Zambia, crude petroleum in Nigeria and Sudan, iron ore in Senegal, and natural gas in Nigeria.

Countries directly affected by wars, internal ethnic or political conflicts, and refugee displacements in 2005 included Angola, Burundi, Central Africa Republic, Chad, Congo (Kinshasa), Côte d'Ivoire, Nigeria, Somalia, Sudan, Togo, and Uganda. The Government of Mauritania was overthrown in August.

In April 2005, Argosy Minerals Inc. of Australia withdrew the force majeure that it had imposed at the Musongati nickel deposit in Burundi because of political instability. Argosy resumed work on Musongati because of improvements in the security situation and the decision of the transitional Government to hold elections in 2005.

On December 31, 2004, the Government of Sudan signed a permanent cease-fire agreement with the Sudanese People's Liberation Army, and a comprehensive peace agreement was signed on January 9, 2005. The agreement included protocols on sharing legislative power and natural resources. The agreement did not address the separate conflict in Darfur, which remained unresolved at the end of 2005.

## Legislation

In September 2004, the Government of Eritrea ordered a halt to all mineral exploration activity in the country while it reviewed the Mining Act. The Government suspension was lifted in January 2005. The Government increased the maximum possible equity interest that it may hold in a project through an option agreement to 30% from 20%.

Effective February 28, 2005, platinum producers could no longer hold proceeds from Zimbabwean mining activity in foreign accounts to fund exploration and development in that country (Robertson Economic Information Services Limited, 2005). The loss of direct access to these earnings may make it more difficult for foreign companies to fund exploration in Zimbabwe.

At the end of 2004, the Government of Liberia passed legislation providing for controls on the export, import, and transit of rough diamond. In addition, the Government suspended the issuance of all permits for diamond mining and placed a moratorium on alluvial diamond prospecting (United Nations Security Council, 2005).

On December 15, 2005, the Ghanaian Parliament passed into law a new Minerals and Mining Bill. The new Minerals and Mining Law, law No. 703, provides for access to mineral rights on a first-come, first-considered basis; a specific timeframe within which all applications should be granted; the right for applicants to demand written reasons from the Minister if an application is rejected; the Government's right to acquire land or authorize its occupation and use if the land is required for mining purposes; the establishment of a cadastral system for the administration of mineral rights; the establishment of the permissible range of royalty rates at not less than 3% or more than 6% of total mining revenues; the Government's right to obtain a 10% free-carried interest in mining leases; and the establishment of the period of duration of a mining lease, which is not to exceed 30 years and which may be renewed once for a period not to exceed an additional 30 years.

In South Africa, the Government's Black Economic Empowerment program required that black ownership of the mining industry reach 15% by 2009 and 26% by 2014. Recent actions to increase black ownership included the acquisition of 20% of Gold Fields Ltd. by black-owned Mvelaphanda Resources Ltd. by 2009; the transfer of mines held by AngloGold Ashanti Ltd. to black-owned African Rainbow Minerals Ltd.; and the acquisition of 30% of Sallies Ltd. by African Renaissance Investments (Pty) Ltd.

## Exploration

Exploration activity, as defined by African exploration budgets reported by the MEG, increased to \$807 million in 2005 from \$572 million in 2004 (Metals Economics Group, 2005). Africa's share of the world exploration budget increased slightly to 16.5% in 2005 from 16.1% in 2004. In 2005, the principal mineral targets in Africa were copper, diamond, gold, and PGM.

African countries that experienced the highest levels of exploration activity in 2005 were, in descending order based on the number of exploration sites as compiled by the USGS, South Africa, Burkina Faso, Ghana, and Zambia, but activity took place in a number of other countries. Gold accounted for approximately 51% of reported African exploration projects, diamond accounted for about 14%, copper and PGM each accounted for about 11%, and nickel accounted for 5%. Early stage projects accounted for about 77% of the 2005 activity, and feasibility stage projects accounted for about 12%.

Australian and Canadian junior companies continued to invest time and money to explore Africa. South African companies continued to expend a sizable amount of their exploration resources outside of South Africa (Creamer Media's Mining Weekly, 2004<sup>§1</sup>).

## Commodity Overview

Estimates for production of major mineral commodities for 2005 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 (2005) 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.

<sup>1</sup>References that include a section mark (§) are found in the Internet References Cited section.

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.*—From 2000 to 2005, African production of refined aluminum increased by 54%. In Mozambique, the Mozal smelter was completed in 2000, and the Mozal 2 smelter, in 2003. South Africa's production increased because of the expansion of the Hillside smelter in December 2003. Output also increased in Cameroon and Egypt. In Ghana, the Valco smelter was shut down because of droughts that reduced the country's effective hydropower capacity. South Africa accounted for about 48% of African aluminum output; Mozambique, 32%; and Egypt, 14% (table 6). Kenya was the only African producer of secondary refined aluminum. Africa accounted for 5% of the world's aluminum production in 2005 (table 4).

African bauxite production declined by about 3% from 2000 to 2005. From 1990 to 2005, Africa's share of world bauxite production decreased to 9% from 16%. Guinea accounted for about 95% of African bauxite production; Ghana accounted for most of the remainder (table 5). In 2005, Guinea was the only African producer of alumina.

*Consumption.*—In 2005, world aluminum consumption amounted to 31.6 million metric tons (Mt) compared with 29.9 Mt in 2004. African consumption of aluminum increased by 3.4% in 2005. In South Africa, aluminum consumption increased to 374,000 t in 2005 from 342,000 t in 2004 (Themba, 2006a).

*Outlook.*—The production of refined aluminum is expected to rise by an average of about 10% per year from 2005 to 2011. The Mozal 3 smelter in Mozambique and the Coega smelter in South Africa are expected to open in mid-2009 and late 2010, respectively. In Cameroon, Alcan Inc. plans to triple production from its smelter by 2010. Aluminum Smelter Co. of Nigeria Ltd. could reopen its smelter at Ikot Abasi by 2009 and reach full capacity by 2011. In Ghana, Alcoa Inc. plans to increase production at the Valco smelter starting in 2006 (table 6; Mail & Guardian, 2006).

African bauxite production was likely to increase by an average of about 10% per year from 2005 to 2011 (table 5). In Guinea, planned increases in alumina refining capacity of about 5 million metric tons per year in 2008 and 2009 are expected to lead to higher bauxite production. The Sangaredi and the Kamsar refineries are likely to start production in late 2008 and 2009, respectively, and the expansion of the Friguia refinery could be completed in 2009. The reopening of the Sierra Mineral Holdings bauxite mine in 2006 and the restart of mining in the Kambia District in 2010 could increase Sierra Leone's bauxite production to 2.7 Mt in 2011.

**Copper.**—*Production.*—Africa's mine production of copper increased by 48% from 2000 to 2005. Zambia was the leading producer in Africa; the country's increasing production was attributable to higher output from the Mufulira and the Nkana Mines and the reopening of the Chambishi Mine. The production increase in Congo (Kinshasa) was mostly attributable

to the opening of the Lonshi and the Dikilushi Mines in 2001 and 2002, respectively. South Africa's output declined because of lower production from the Palabora Mine and the closure of the Maranda Mine in 2004. In 2005, Zambia accounted for 65% of African copper mine production; South Africa, 15%; and Congo (Kinshasa), 13% (table 7). Africa's share of world copper mine production was 5% in 2005 compared with 14% in 1990.

Africa's refined copper production rose by 40% from 2000 to 2005; increased production from the Bwana Mkubwa and the Mufulira plants in Zambia more than offset lower South African output. In South Africa, production declined because of lower output from the Palabora refinery. In 2005, Zambia accounted for 77% of African refined copper production; South Africa, 19%; and Egypt, 3%. Congo (Kinshasa), which accounted for 37% of continental refined copper output in 1990, had ceased production by 2000 (table 8). Egypt was the only producer of secondary refined copper; primary production accounted for most African production.

*Consumption.*—In 2005, world refined copper consumption increased to 16.8 Mt from 16.7 Mt in 2004; African consumption of copper amounted to about 170,000 t in 2005. South Africa's consumption declined to 82,000 t in 2005 from 84,000 t in 2004 (Themba, 2006b).

*Outlook.*—African copper mine production is expected to rise by an average of about 16% per year from 2005 to 2011. Congo (Kinshasa) could account for about one-half of the increase in output. Nikanor plc plans to open the Kananga and the Tilwezembe Mines in 2006 and 2007, respectively, and to restart production at the Kamoto-Oliveira-Virgule (KOV) Mine in late 2009. Central African Mining and Exploration Company plc (CAMEC) is expected to open a new mine during the first quarter of 2008 and to reach full capacity in 2009. Tenke Mining plans to start the Tenke Fungurume project in late 2008. Anvil Mining Ltd. plans to increase production at Kulu in 2006 and to open the Mutoshi Mine in early 2007. Metorex Ltd. is likely to start the Ruashi Tailings project in mid-2006 and the Ruashi Mine in July 2008. Other new sources of production include the Kolwezi Tailings project in 2008 and the Etoile Mine in 2009. The Ruashi Tailings project and the Lonshi Mine are expected to be shut down in 2010.

Output is likely to rise sharply in Zambia because of higher production from the Kansanshi Mine in 2006 and the opening of the Chingola and the Lumwana Mines in 2007 and 2009, respectively. Expansions are planned for the Mufulira, the Mufulira South, and the Nkana Mines in 2007 (table 7).

In Botswana, the Dukwe mine is expected to open in 2009 and to reach full capacity by 2011; production from the Phoenix Mine is likely to triple by 2011. Nevsun Resources Ltd. plans to start mining from a copper-rich zone at Bisha in Eritrea in 2010. In Mauritania, the Guelb Moghrein Mine is expected to start production in late 2006. South Africa's production could increase because of the expansion of the Limpopo PGM mine (table 7).

The production of refined copper is expected to rise by an average of 17% per year from 2005 to 2011. Zambia's production is expected to increase because of higher output from the Mufulira refinery and the Bwana Mkubwa and the Kansanshi solvent extraction-electrowinning (SX-EW) plants

in 2006, and the Konkola SX-EW plants by 2007. In Congo (Kinshasa), new SX-EW plants could open at the Kolwezi Tailings project and the Mutoshi Mine in early 2008, and at the KOV Mine in late 2009. CAMEC also plans to start production at the Luita plant in 2008. Congo (Kinshasa), which did not produce refined copper in 2000, could account for more than 25% of Africa's refined copper output by 2011 (table 8).

**Gold.—Production.—**Africa's gold mine production was 522,000 kilograms in 2005, which was a decrease of 14% compared with that of 2000. Production was considerably less than that of 1990 because of the long-term decline in South African production (table 9). From 1990 to 2005, Africa's share of world gold mine production decreased to about 21% from 32% (table 4).

In South Africa, the decrease in production since 2000 was broad based, with output declining at the Great Noilgwa, the Driefontein, the Kloof, the Mponeng, the Savuka, and the Tau Tona Mines. The Ergo, the North West, and the St. Helena Mines were closed. The decline in Ghana's production was partially attributable to lower output at the Bibiani Mine. Output also decreased in Zimbabwe (table 9).

In Tanzania, production increased in recent years because of the opening of the Geita Mine in 2000; the Bulyanhulu Mine in 2001; the North Mara Mine in 2002; the Buhemba Mine in 2003; and the Tulawaka Mine in 2005. Output increased since 2000 in Mali because of the opening of the Loulo, the Morila, and the Yatela Mines. The Mupane and the Samira Hill Mines were opened in Botswana and Niger, respectively; these countries had only artisanal gold production before 2004.

In 2005, South Africa accounted for 56% of African gold production; Ghana, 13%; Tanzania, 10%; and Mali, 8%. South Africa's share of continental gold production continued to decline from 89% in 1990 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 17% from 2005 to 2009. The long-term decline in South Africa's production could be reversed because of the expected completion of the Moab Khotsoeng Mine in 2006, the Dominion Mine in 2007, the Tshepong Decline project in 2008, the Phakisa Shaft in 2009, and the planned expansion of the Masimong Mine in 2010. By 2011, these projects could more than offset the shutdown of the Ergo and the North West Mines in 2005, the planned closure of the Crown Mine in 2009, and lower production from the Great Noligwa, the Kopanang, and the Tau Lekoa Mines (table 9).

In Ghana, the outlook is for a substantial increase in output because of the expected opening of the Ahafo Mine in the second half of 2006 and the Akyem Mine in 2008 and higher production from the Chirano and the Wassa Mines. Output is expected to decline at the Bibiani Mine (table 9).

Tanzania's production is likely to rise to 60 t by 2009 with the opening of the Buckreef Mine in 2007 and the Bugwazi Mine in 2008 and the increased capacity at the North Mara Mine; these increases could more than offset the decreased production at the Geita Mine. Production in Tanzania is expected to decline to 56 t by 2011 because of the planned closure of the Tulawaka Mine in 2010. In Mali, the opening of the Tabakoto Mine in

2006 and the reopening of the Syama Mine in 2008 are likely to be offset by the shutdown of the Yatela Mine in 2007 and lower production at the Morila Mine (table 9).

Several African countries that had only artisanal gold production in 2005 are likely to open large-scale gold mines in the near future. By January 2008, production is expected to start at the Bonikro gold deposit in Côte d'Ivoire. In Mauritania, Rio Narcea Gold Mines Ltd. plans to start production at the Tasiast Mine by mid-2007. The Youga and the Taparko Mines are expected to open in Burkina Faso by 2007 and 2009, respectively. Gold-rich zones in the Bisha Mine in Eritrea are planned to be mined from 2008 to 2010. In Congo (Kinshasa), the Kilo Moto Mine could open in 2009. Sudan's only large-scale gold mine is expected to shut down in 2010 (table 9).

**Iron and Steel.—Production.—**African production of crude steel increased by 27% from 2000 to 2005. The majority of the increase was attributable to Egypt. South Africa accounted for 54% of regional crude steel production; Egypt, 32%; Libya, 7%; and Algeria, 6% (table 11). Africa's share of world crude steel production amounted to 2% in 2005 (table 4).

South Africa produced about 7.1 Mt of hot-rolled steel products in 2005, and Libya, 1.67 Mt. Other African producers of hot-rolled steel products included Algeria, Egypt, Morocco, and Tunisia (International Iron and Steel Institute Committee on Economic Studies, 2006, p. 48).

**Consumption.—**Africa accounted for 2% of the world's finished steel consumption. Africa consumed 18 Mt of finished steel products in 2005 compared with 17.5 Mt in 2004 and 15 Mt in 2000 [MEPS (International), undated§].

**Outlook.—**Crude steel production is expected to rise by an average of about 5% per year from 2005 to 2011. Nigeria, which accounted for less than 1% of African crude steel output in 2005, could increase its share to 10% by 2011 with the opening of the Ajaokuta plant in 2006 and higher production at the Delta plant. In South Africa, the expansion of the Vanderbijlpark plant is scheduled to take place from 2006 to 2009. In Algeria, increased utilization of existing capacity is expected to raise national steel production to 2.5 Mt by 2011. Production could increase in Zimbabwe as Zimbabwe Iron and Steel Company restores its capacity; improvement in this company's situation depends upon the restoration of economic and political stability (table 11). African consumption of finished steel is expected to rise to 19 Mt by 2008 [MEPS (International), undated§].

**Iron Ore.—Production.—**In 2005, the iron content of ore produced in Africa amounted to 34.8 Mt compared with 32.1 Mt in 2000. Higher production from the Sishen and the Thabazimbi Mines in South Africa more than offset lower output in Egypt and Mauritania. South Africa was the leading iron ore producer in Africa and accounted for 72% of continental output; Mauritania, 21%; and Egypt, 5% (table 10).

**Outlook.—**The iron content of ore produced in Africa is expected to increase to almost 62 Mt in 2011 (table 10). In South Africa, the expansion of the Sishen Mine is likely to be completed in 2009; a further expansion of the mine could be completed by 2011. Production at the Bruce, the King, and the Mokaning Mines (BKM) could start in 2008; a proposed expansion of the mines could be completed in 2010. The opening of BKM would more than offset the expected decline

in output from the Beeshok Mine after 2008. The Faleme iron ore project in Senegal could start production in 2011. In Nigeria, mining is expected to restart at the Ajaybanko and the Itakpe iron ore deposits in 2006 or 2007 and to reach full production by 2009. Output is also expected to increase in Algeria (table 10).

**Lead.—Production.**—From 2000 to 2005, African lead mine production decreased by nearly 39%. South Africa's production declined because of lower production at the Black Mountain Mine and the closure of the Pering Mine in 2003. The decrease in Morocco's output was attributable to the closure of the Touissit Mine in 2002 and technical problems experienced by Compagnie Minere de Guemassa. In Tunisia, the Bouhabeur and the Fej Lahdoum Mines were closed in 2004, and the Bougrine Mine, in 2005. In Namibia, output increased at the Rosh Pinah Mine. In 2005, Morocco and South Africa accounted for 39% each of African lead mine production, and Namibia, 13% (table 12). Africa's share of the world's lead mine production was about 3% in 2005 (table 4).

African production of primary refined lead declined by 45% compared with that of 2000; the decrease may have been attributable to lower lead mine production in Morocco. Production also declined in Algeria. Morocco, which was the leading African producer of primary refined lead, accounted for 88% of continental output (table 13).

From 2000 to 2005, Africa's production of secondary refined lead increased by 34%. South Africa accounted for 86% of African secondary refined lead output; Kenya, Morocco, and Nigeria accounted for the remainder. The share of primary lead in total refined lead production in Africa declined to 35% in 2005 from 64% in 1995 and 72% in 1990 (tables 13, 14).

**Consumption.**—In 2004 (the latest year for which data were available), world refined lead consumption was about 7.08 Mt compared with 6.8 Mt in 2003. South African lead consumption increased to 80,700 t in 2004 from 78,700 t in 2003 (Maphango, 2005).

**Outlook.**—The decline in African lead mine production is likely to continue, with output expected to decline by 22% from 2005 to 2011. Most of the decrease would be attributable to the closure of the Bougrine Mine in Tunisia in 2005 and the Rosh Pinah Mine in Namibia by 2010 (table 12). Secondary refined lead production is expected to increase in South Africa in 2006 (table 14).

**Nickel.—Production.**—African mine production of nickel increased by nearly 9% from 2000 to 2005. South Africa accounted for most of the increase in production; output also increased in Botswana and Zimbabwe. The majority of South Africa's nickel output was a coproduct of PGM mining. Higher South African production was partially attributable to increased output from the Nkomati Mine. In 2005, South Africa accounted for 47% of African nickel mine output; Botswana, 43%; and Zimbabwe, 9% (table 15). Minor tonnages of nickel were recovered as a byproduct of cobalt operations in Morocco.

**Consumption.**—In 2004 (the latest year for which data were available), South Africa's consumption of nickel increased to 25,000 t from 24,000 t in 2003. The stainless steel industry accounted for most of South Africa's nickel demand (Harding, 2006).

**Outlook.**—Nickel mine production is likely to double from 2005 to 2011. The startup of the Ambatovy nickel and cobalt mine in 2009 in Madagascar is expected to account for the majority of the increase. Madagascar, which did not mine nickel in 2005, could have a 33% share of African nickel mine production by 2011. South Africa's output is expected to nearly double by 2011 because of increased capacity at the Nkomati nickel mine and the Limpopo and the Marikana PGM mines. In Zambia, Albidon Ltd. planned to start production from the Munali project in 2008. Production could increase at the Mimosa PGM mine in Zimbabwe. Botswana's production is likely to decline because of the closure of the Selebi-Phikwe Mine in 2011 or 2012 (table 15).

**Platinum-Group Metals.—Production.**—From 2000 to 2005, Africa's production of palladium and platinum increased by 55% and 47%, respectively. South African production increased because of higher output from the Bafokeng, the Impala, the Kroondal, the Marikana, and the Rustenburg Mines, and the opening of the Modikwa Mine in 2002. Production increased in Zimbabwe because of higher output from the Mimosa Mine and the opening of the Ngezi Mine in 2001. South Africa, which was the continent's dominant producer of PGM in Africa, accounted for 97% and 96% of the production of platinum and palladium, respectively (tables 16, 17).

**Outlook.**—African mine production of palladium is expected to increase by an average of between 4% and 5% per year from 2005 to 2011, and platinum, by between 3% and 4% per year (tables 17, 18). In South Africa, the increase is likely to be attributable to the opening of the Mototolo Mine in late 2006 and the Two Rivers Mine in 2007; the expansions of the Marula Mine in 2007 and 2009, the Limpopo Mine in 2007 and 2010, the Rustenburg Mine in 2008, and the Nkomati Mine by the end of 2009; and higher production from the Everest, the Kroondal, the Marikana, and the Modikwa Mines. Higher output in Zimbabwe is likely to result from the expansion of the Mimosa and the Ngezi Mines and the opening of the Unki Mine in 2009.

**Zinc.—Production.**—From 2000 to 2005, Africa's mine production of zinc declined by about 17%. The decrease in Morocco's output was attributable to technical problems experienced by Compagnie Minere de Guemassa. In South Africa, the closure of the Pering Mine in 2003 and the Maranda Mine in 2004 more than offset higher output from the Black Mountain Mine. In Tunisia, the Bouhabeur and the Fej Lahdoum Mines were closed in 2004, and the Bougrine Mine, in 2005. Algerian output declined because of the shutdown of El Abed and the Kherzet Youcef Mines. Namibia's production increased because of the opening of the Skorpion Mine; production also restarted at Slag Treatment Plant Lubumbashi in Congo (Kinshasa). In 2005, Morocco accounted for 36% of African zinc mine production; Namibia, 32%; South Africa, 15%; and Tunisia, 7% (table 18). Africa's share of world zinc mine production was about 2% in 2005 (table 4).

African production of zinc metal increased by 85% compared with that of 2000. In Namibia, the Skorpion smelter was opened in 2003. Production declined in Algeria and South Africa. Namibia, which did not produce zinc metal prior to 2003, accounted for 48% of continental zinc metal production in 2005.

South Africa's share declined to 40% in 2005 from 75% in 2000, and Algeria's share, to 12% from 25% (table 19).

**Consumption.**—In 2005, world refined zinc consumption remained nearly unchanged at about 10.3 Mt. South African zinc consumption increased to 103,000 t in 2005 from 91,000 t in 2004 (Maphango, 2006).

**Outlook.**—The decline in African zinc mine production was likely to continue, with output declining by 13% from 2005 to 2011. Most of the decrease would be attributable to the closure of the Bougrine Mine in Tunisia in 2005 and the Rosh Pinah Mine in Namibia by 2010 (table 18). In Congo (Kinshasa), the proposed reopening of the Kipushi Mine and the reprocessing of zinc and germanium tailings near Kolwezi could lead to further increases in production, but whether these projects will be implemented by the end of 2011 is uncertain.

Higher production from the Skorpion smelter in Namibia could increase regional production of zinc metal by nearly 8% by 2007. This increase would more than offset the decreased output expected from the Zincor Mine in South Africa (table 19).

### **Industrial Minerals**

**Diamond.**—**Production.**—In 2005, Africa's share of world diamond production, by volume, was 46% (table 4). African diamond production increased by nearly 51% in 2005 compared with that of 2000. The increase in output was broadly based, with production rising in Angola, Botswana, Congo (Kinshasa), Ghana, Guinea, Lesotho, Namibia, Sierra Leone, South Africa, and Zimbabwe. Production declined in the Central African Republic and Tanzania (table 20).

Congo (Kinshasa) accounted for nearly one-half of the increase in production, by volume. Increased political stability and the Kimberley Process led to higher production by artisanal miners. Société Minière de Bakwanga (MIBA) also increased its output, and Sengamines and Midamines SPRL started mining operations in 2001 and 2005, respectively.

In Botswana, production increased at the Jwaneng, the Letlhakane, and the Orapa Mines, and the Damtshaa Mine was opened. In South Africa, production increased at the Finsch, the Kimberley, the Namaqualand, and the Venetia Mines. In Namibia, higher production was attributable to Namdeb Diamond Corporation (Pty) Ltd.'s increased output. The Murowa Diamond Project commenced production in Zimbabwe in 2004. Botswana accounted for 35% of African diamond output by volume; Congo (Kinshasa), 34%; South Africa, 17%; and Angola, 8% (table 20).

In 2005, the global value of rough diamond production amounted to \$12.7 billion, of which Africa accounted for about 60%. Botswana accounted for 24% of the value of global rough diamond output; South Africa, 12%; Angola, 11%; Congo (Kinshasa), 8%; and Namibia, 5% (Janse, 2006).

In November 2002, the Kimberley Process Certification Scheme was established to reduce the trade of conflict diamond, particularly diamond originating from Angola, Congo (Kinshasa), and Sierra Leone. The establishment of the Kimberley Process 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 2005, the following African countries had met the minimum requirements of the Kimberley Process Certification Scheme: Angola, Botswana, Central African Republic, Congo (Kinshasa), Côte d'Ivoire, Guinea, Lesotho, Mauritius, Namibia, Sierra Leone, South Africa, Swaziland, Tanzania, Togo, and Zimbabwe.

Illicit diamond production controlled by the Kimberley Process focused on Côte d'Ivoire and Liberia in 2005. At the Kimberley Process plenary session held in Moscow in November, the Chair called for action to be taken to help provide technical assistance to countries neighboring Côte d'Ivoire to strengthen controls on diamond trade (Mining Environmental Management, 2005).

**Outlook.**—The production of rough diamond is expected to increase by an average of nearly 3% per year from 2005 to 2011. In Angola, the Fucauma, the Kamachia-Kamajiku, the Luarica, and the Rio Lapi Garimpo Mines are expected to contribute to higher output. Production could also rise in Congo (Kinshasa) because of the possible expansion of MIBA's facilities by 2010. European Diamonds plc started production in Lesotho in 2005; the company planned to reach full capacity in 2006. Zimbabwe's production could increase because of higher production from Murowa. Output is also expected to rise in Namibia and Tanzania because of expansions at mines operated by DeBeers Group (table 20).

**Phosphate Rock.**—**Production.**—In 2005, the diphosphorous pentoxide ( $P_2O_5$ ) content of African phosphate rock production amounted to about 14.6 Mt compared with 12.5 Mt in 2000. The majority of the increase in output was attributable to higher production by Office Cherifien des Phosphates in Morocco; Egypt's production also increased. Morocco, which was the leading producer of phosphate rock in Africa, accounted for 60% of continental phosphate rock output in 2004; Tunisia, 16%; and South Africa, 7% (table 21).

**Outlook.**—The  $P_2O_5$  content of African phosphate rock production is expected to remain nearly unchanged through 2011. In Morocco, Office Cherifien des Phosphates could complete an expansion by 2009. Production is expected to decline in Algeria and Tunisia (table 21).

### **Mineral Fuels**

**Coal.**—**Production.**—African coal production increased by 9% from 2000 to 2005; most of the increase was attributable to South Africa. The Goedgedonden, the Mafube, and the Isibonelo Mines opened in 2003, 2004, and 2005, respectively, and production increased at a number of other mines. Output also increased in Botswana, Egypt, Malawi, Niger, Swaziland, and Zambia and decreased in Morocco and Zimbabwe. South Africa, which was the dominant coal producer in Africa, accounted for 98% of regional coal output; Zimbabwe, 1%; and others, less than 1% (table 22). 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 2005.

**Consumption.**—Africa accounted for about 3% of world coal consumption in 2005. Within the region, South Africa accounted for 92% of African coal consumption. Nearly 71% of South

Africa's coal production was consumed domestically. From 2000 to 2005, Africa's consumption of coal increased by about 12% (British Petroleum plc, 2006, p. 35).

*Outlook.*—African coal production is expected to increase by an average of 3% per year from 2005 to 2011. South Africa is likely to be responsible for the majority of the increase; its production could increase to 276 Mt by 2011 (table 22). Higher output would be attributable to the opening of the Kriel South Mine in 2005, the Forzando South Mine in 2006, the Mooikraal Mine in mid-2007, and the Inyanda Mine in 2008; and the expansions of the Goedgevonden and the Leeuwpans Mines in 2006, the Syferfontein Mine in 2007, the Mafube Mine in 2008, and the Grootegeluk Mine in 2010.

Mozambique is expected to become the second-ranked coal producer in Africa with the development of the Moatize Project in 2010. Botswana is likely to become the third-ranked producer because of the expansion of the Morupule Colliery in 2008 and the start of production at the Mmamabula East project in 2011. In Zimbabwe, output could increase at Hwange Colliery by 2011 if economic and political stability are restored. Production is also expected to rise in Malawi, Nigeria, and Tanzania (table 22).

**Uranium.**—*Production.*—In 2005, African uranium mine production increased by 7% compared with that of 2000. Most of the increase was attributable to higher production at the Rossing Mine in Namibia; Niger's output also increased. South Africa's production declined because of lower output from gold mines. Namibia accounted for 46% of African uranium production; Niger, 44%; and South Africa, less than 10%. In 1990, Niger's and South Africa's shares of continental production were 30% and 27%, respectively (table 23). Africa accounted for about 16% of the world's uranium production in 2005 (table 4).

*Consumption.*—South Africa was the only regional consumer of uranium in 2005. Africa accounted for less than 1% of the electricity generated worldwide by nuclear power (British Petroleum plc, 2006, p. 36).

*Outlook.*—Continental uranium mine production is expected to rise by 10% per year from 2005 to 2011 (table 23). Namibia's uranium production is likely to increase substantially with the opening of the Langer Heinrich Mine in late 2006 and its planned expansion that could be completed by 2010 or 2011. In South Africa, the Dominion mine is expected to open in 2007 and to produce more than 1,800 t/yr of uranium oxide ( $U_3O_8$ ) in 2010. AngloGold Ashanti Ltd. plans to increase uranium production from its South African gold mines by 40% by 2009. Paladin Resources Ltd. of Australia plans to produce about 1,500 t/yr of  $U_3O_8$  from the Kayelekera Project in Malawi starting in the third quarter of 2008.

## Trade Review and Outlook

Africa's current account surplus amounted to 2.3% of the GDP in 2005; the current account deficit amounted to 0.1% of the GDP in 2004. In 2005, sub-Saharan countries ran an average deficit of 0.6% of the GDP, and countries in the Arab Maghreb Union ran an average surplus of 12.2% of the GDP. Trade surpluses in oil-exporting countries more than offset trade

deficits in oil-importing countries (International Monetary Fund, 2006a, p. 65).

Oil-importing countries had an average current account deficit of 3.3% of the GDP in 2005, and oil-exporting countries had an average current account surplus of 12.2% of the GDP. Out of 33 African nations for which information was available, 20 countries experienced a decline in their terms of trade from 2002 to 2005 and 13 experienced an improvement. The countries that experienced the worst decline in their terms of trade were oil importers. However, Botswana's terms of trade improved because higher prices for oil imports were more than offset by higher prices for diamond exports. Similar reasoning held for Mozambique because of higher prices for aluminum; in Niger, for uranium; and in Zambia, for copper (International Monetary Fund, 2006a, p. 65, 67).

The average current account deficit for oil-importing countries is expected to increase to 4.1% of the GDP in 2006 and to 3.8% of the GDP in 2007. For oil-exporting countries, the surplus is predicted to rise to 15.4% of the GDP in 2006 and 15.8% of the GDP in 2007. Africa was expected to run a current account surplus of 3.6% of the GDP in 2006 and 4.2% of the GDP in 2007 (International Monetary Fund, 2006a, p. 65).

In 2004 or 2005, mineral fuels accounted for more than 90% of the export earnings of Algeria, Equatorial Guinea, Libya, and Nigeria. Minerals and mineral fuels accounted for more than 80% of the export earnings of Botswana (led by, in order of value, diamond, copper, nickel, soda ash, and gold), Congo (Brazzaville) (petroleum), Congo (Kinshasa) (diamond, petroleum, cobalt, and copper), Gabon (petroleum and manganese), Guinea (bauxite, alumina, gold, and diamond), Sierra Leone (diamond), 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), Namibia (diamond, uranium, gold, and zinc), 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 and South Africa, as was uranium in Niger (International Monetary Fund, 2005, p. 86; 2006b, p. 67; 2007, p. 25).

Africa's natural gas exporters included Algeria, which accounted for 72% of the continent's natural gas exports; Nigeria, 13%, Egypt, 9%, and Libya, 6%. Europe received 91% of African total natural gas exports and was the destination of 95% of Africa's natural gas exports by pipeline and 88% of Africa's liquefied natural gas (LNG) exports. The United States received 11% of Africa's LNG exports, and countries of the Asia and the Pacific region, 1% (British Petroleum plc, 2006, p. 30).

In 2005, Europe received 35% of Africa's petroleum exports; the United States, 32%; China, 10%; Japan, 2%; and other countries in the Asia and the Pacific region, 12%. West African countries sent 45% of their exports to the United States and 32% to China, Japan, and other countries in the Asia and the Pacific region. North African countries sent 64% of their exports to Europe and 18% to the United States. Intra-regional exports to African countries amounted to only 2% of total African petroleum exports (British Petroleum plc, 2006, p. 20).



Intraregional minerals trade was, however, significant for gold. South Africa imported 142,000 kilograms per year of gold mostly from West African countries to supply its gold refinery. A majority of African gold mine production was refined in South Africa prior to export 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, petroleum, and uranium, most of or all 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 West African Pipeline Project, which was 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. Currently (2005), natural gas was being flared by Nigeria; in the future, Nigeria expected to export natural gas to Benin, Ghana, and Togo. The Government of Nigeria had committed to ending the flaring of natural gas, which would also lead to decreased pollution.

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 Programme, and the United Nations Industrial Development Organization began the Global Mercury Project in August 2002 to alleviate these problems. The Global Mercury Project has been providing cleaner technologies and training for miners, conducting health assessments, and helping institute government regulatory capacities.

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TABLE 1  
AFRICA: AREA AND POPULATION IN 2005<sup>1</sup>

Country	Area <sup>2</sup> (square kilometers)	Estimated population <sup>3</sup> (millions)
Algeria	2,381,740	32.9
Angola	1,246,700	15.9
Benin	112,620	8.4
Botswana	600,370	1.8
Burkina Faso	274,200	13.2
Burundi	27,830	7.5
Cameroon	475,440	16.3
Cape Verde	4,033	0.5
Central African Republic	622,984	4.0
Chad	1,284,200	9.7
Comoros	2,170	0.6
Congo (Brazzaville)	342,000	4.0
Congo (Kinshasha)	2,345,410	57.5
Côte d'Ivoire	322,460	18.2
Djibouti	23,000	0.8
Egypt	1,001,450	74.0
Equatorial Guinea	28,051	0.5
Eritrea	121,320	4.4
Ethiopia	1,127,127	71.3
Gabon	267,667	1.4
Gambia, The	11,300	1.5
Ghana	239,460	22.1
Guinea	245,857	9.4
Guinea-Bissau	36,120	1.6
Kenya	582,650	34.3
Lesotho	30,355	1.8
Liberia	111,370	3.3
Libya	1,759,540	5.9
Madagascar	587,040	18.6
Malawi	118,480	12.9
Mali	1,240,000	13.5
Mauritania	1,030,700	3.1
Mauritius	2,040 <sup>4</sup>	1.2
Mayotte	374	0.2
Morocco	446,550	30.2
Mozambique	801,590	19.8
Namibia	825,418	2.0
Niger	1,267,000	14.0
Nigeria	923,768	132
Reunion	2,517	0.8 <sup>2</sup>
Rwanda	26,338	9.0
Sao Tome e Principe	1,001	0.2
Senegal	196,190	11.7
Seychelles	455	0.1
Sierra Leone	71,740	5.5
Somalia	637,657	8.2
South Africa	1,219,912	45.2
Sudan	2,505,810	36.2
Swaziland	17,363	1.1
Tanzania	945,087	38.3
Togo	56,785	6.1
Tunisia	163,610	10.0
Uganda	236,040	28.8

See footnotes at end of table.

TABLE 1--Continued  
AFRICA: AREA AND POPULATION IN 2005<sup>1</sup>

Western Sahara	266,000	0.3 <sup>2</sup>
Zambia	752,614	11.7
Zimbabwe	390,580	13.0
Total	30,360,083	896
United States <sup>5</sup>	9,631,418	297
World	148,940,000	6,440

NA Not applicable.

<sup>1</sup>Table includes data available through February 2007. Population estimates are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Source: U.S. Central Intelligence Agency, World Factbook 2005.

<sup>3</sup>Source: World Bank 2005, World Development Indicators Database.

<sup>4</sup>Includes Agalega Islands, Cargados Carajos Shoals (Saint Brandon), and Rodriguez.

<sup>5</sup>Includes only the 50 States and the District of Columbia.

TABLE 2  
AFRICA: ECONOMY IN 2005<sup>1,2</sup>

Country	Estimated GDP (billions) <sup>3</sup>	Estimated GDP per capita <sup>3</sup>	Real GDP annual percentage change <sup>4</sup>
Algeria	\$237.7	\$7,189	5.3%
Angola	43.4	2,813	14.7%
Benin	8.7	1,176	3.9%
Botswana	18.1	11,410	3.8%
Burkina Faso	16.8	1,285	4.8%
Burundi	5.5	739	0.9%
Cameroon	43.2	2,421	2.6%
Cape Verde	3.1	6,418	5.5%
Central African Republic	4.6	1,128	2.2%
Chad	13.7	1,519	5.6%
Comoros	1.1	1,889	2.8%
Congo (Brazzaville)	4.6	1,369	9.2%
Congo (Kinshasa)	46.5	809	6.6%
Côte d'Ivoire	27.5	1,510	-0.3%
Djibouti	1.6	2,253	3.2%
Egypt	305.3	4,317	4.9%
Equatorial Guinea	18.8	16,507	18.6% <sup>5</sup>
Eritrea	4.0	858	4.8%
Ethiopia	60.1	823	8.7%
Gabon	9.6	7,055	2.2%
Gambia, The	3.0	2,002	5.0%
Ghana	55.2	2,643	5.8%
Guinea	18.9	2,035	3.0%
Guinea-Bissau	1.2	736	3.5%
Kenya	48.3	1,445	2.8%
Lesotho	5.0	2,113	1.2%
Liberia	3.4	1,033	5.3%
Libya	67.2	11,624	3.5%
Madagascar	16.2	908	4.6%
Malawi	7.7	596	2.6%
Mali	14.4	1,154	5.4%
Mauritania	7.2	2,535	5.4%
Mauritius	16.0	12,895	4.5%
Mayotte	0.5 <sup>5,6</sup>	2,600 <sup>5,6</sup>	NA
Morocco	135.7	4,503	1.6%
Mozambique	27.0	1,379	7.7%
Namibia	15.1	7,478	3.5%
Niger	11.0	872	4.5%
Nigeria	173.8	1,188	6.9%
Reunion	4.8 <sup>5</sup>	6,200 <sup>5</sup>	2.5% <sup>5</sup>
Rwanda	12.2	1,380	5.0%
Sao Tome e Principe	0.3	1,547	3.0%
Senegal	20.5	1,759	6.2%
Seychelles	1.0	12,059	-2.3%
Sierra Leone	4.9	903	7.5%
Somalia	4.8 <sup>5</sup>	600 <sup>5</sup>	2.4% <sup>5</sup>
South Africa	570.2	12,161	4.9%
Sudan	84.8	2,522	8.0%
Swaziland	5.7	5,245	1.8%
Tanzania	27.1	723	7.0%
Togo	9.4	1,675	2.8%
Tunisia	83.7	8,255	4.2%
Uganda	43.3	1,501	5.6%

See footnotes at end of table

TABLE 2--Continued  
AFRICA: ECONOMY IN 2005<sup>1,2</sup>

Western Sahara	NA	NA	NA
Zambia	10.8	931	5.1%
Zimbabwe	30.6	2,607	-7.1%
Total	2,414.5	3,027.0	NA
United States	12,278	41,399.4	3.5%
World	55,655	NA	3.6%

NA Not available

<sup>1</sup>Source: International Monetary Fund, World Economic Outlook Database, April 2006.

<sup>2</sup>Table data compiled in February 2007 and may differ from data presented in individual country chapters, which were written previously.

<sup>3</sup>Gross domestic product (GDP) based on purchasing power parity.

<sup>4</sup>Real GDP annual percentage change compared with 2004.

<sup>5</sup>Source: U.S. Central Intelligence Agency, World Factbook 2005.

<sup>6</sup>2003 estimate.

TABLE 3  
SELECTED SIGNIFICANT AFRICAN EXPLORATION SITES IN 2005

Country	Type <sup>1</sup>	Site	Commodity <sup>2</sup>	Company	Resource <sup>2,3</sup>	Exploration <sup>4</sup>
Botswana	F	Dukwe	Cu	African Copper plc.	94,000 t Cu	Extensive drilling.
Do.	E	Orapa/AK6	Diamond	African Diamonds plc.	Data not released	Extensive work program.
Burkina Faso	E	Belahouro	Au	Goldbelt Resources Ltd.	933,000 oz Au	Extensive drilling.
Do.	E	Essakan	Au	Orezone Resources Inc.	2,4 Moz Au	Do.
Do.	E	Sega	Au	do.	Data not released	Do.
Egypt	F	Sukari	Au	Centamin Egypt Ltd.	3,09 Moz Au	Feasibility drilling.
Eritrea	E	Asmara area	Au, Cu, Ag, Zn	Sunridge Gold Corp.	Data not released	Extensive drilling.
Do.	E	Bisha	Au, Ag, Cu, Zn	Newmont Resources Ltd.	(5)	Do.
Ghana	D	Akyem	Au	Newmont Mining Corp.	5,4 Moz Au	Do.
Guinea	F	Kouroussa	Au	Cassidy Gold Corp.	433,000 oz Au	Do.
Senegal	F	Sabodala	Au	Mineral Deposits Ltd.	Data not released	Do.
South Africa	E	Akanani	PGM, Au	AfriOre Ltd.	Data not released	Do.
Do.	E	Drenthe	PGM, Au	Anooraq Resources Corp.	7.7 Moz Pd and Pt + Au	Do.
Do.	E	Leeukop	PGM, Au	African Platinum plc.	13.8 Moz Pd and Pt + Au	Do.
Do.	E	Western Bushveld	PGM, Au	Platinum Group Metals Ltd.	1.3 Moz Pd, Pt, and Rh + Au	Do.
Tanzania	E	Buzwagi	Au	Barrick Gold Corp.	Data not released	Do.
Zambia	D	Lumwana	Cu, Co, Au	Equinox Minerals Corp.	2.2 Mt Cu, 57,000 t Co, 173,000 oz Au	Do.
Do.	F	Munali/Enterprise	Ni, PGM	Albidon Ltd.	97,000 t Ni, 223,000 oz PGM	Feasibility drilling.

<sup>1</sup>D--Approved for development; E--Active exploration; F--Feasibility work ongoing or completed.

<sup>2</sup>Abbreviations used in this table for commodities include the following: Ag--silver; Au--gold; Co--cobalt; Cu--copper; Ni--nickel; Pd--palladium; PGM--platinum-group metals;

Pt--platinum; Rh--rhodium; Zn--zinc. 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 2005 data reported from various sources; values vary from measured reserves to identified resources. 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.

<sup>5</sup>Content of principal metals is 1.4 Moz Au, 30.9 Moz Ag, 375,000 t Cu, 878,000 t Zn.

TABLE 4  
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2005<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	--	--	--	--	--	697 <sup>p</sup>	1,579 <sup>p</sup>	1,007 <sup>p</sup>	--	--	--
Angola	--	--	--	--	--	--	--	--	--	--	--
Benin	--	--	--	--	--	20	--	--	--	--	--
Botswana	--	--	--	31 <sup>e</sup>	--	2,709	--	--	--	--	--
Burkina Faso	--	--	--	--	--	1,397	--	--	--	--	--
Burundi	--	--	--	--	--	3,905	--	--	--	--	--
Cameroon	--	90	--	--	--	1,500 <sup>e</sup>	--	--	--	--	--
Cape Verde	--	--	--	--	--	--	--	--	--	--	--
Central African Republic	--	--	--	--	--	7 <sup>e</sup>	--	--	--	--	--
Chad	--	--	--	--	--	150 <sup>e</sup>	--	--	--	--	--
Comoros	--	--	--	--	--	--	--	--	--	--	--
Congo (Brazzaville)	--	--	--	--	--	20 <sup>e</sup>	--	--	--	--	--
Congo (Kinshasa)	--	--	--	22,000	92	4,200 <sup>e</sup>	--	130	--	--	--
Côte d'Ivoire	--	--	--	--	--	1,638	--	--	--	--	--
Djibouti	--	--	--	--	--	--	--	--	--	--	--
Egypt	--	244	--	--	--	--	2,600 <sup>e</sup>	5,600 <sup>e</sup>	--	8 <sup>e</sup>	--
Equatorial Guinea	--	--	--	--	--	200 <sup>e</sup>	--	--	--	--	--
Eritrea	--	--	--	--	--	25	--	--	--	--	--
Ethiopia	--	--	--	--	--	3,900 <sup>e</sup>	--	--	--	--	--
Gabon	--	--	--	--	--	300 <sup>e</sup>	--	--	--	1,290	--
Gambia, The	--	--	--	--	--	--	--	--	--	--	--
Ghana	726	13 <sup>e</sup>	--	--	--	66,852	--	--	--	600 <sup>e</sup>	--
Guinea	15,200 <sup>e</sup>	--	--	--	--	15,300	--	--	--	--	--
Guinea-Bissau	--	--	--	--	--	--	--	--	--	--	--
Kenya	--	2 <sup>e</sup>	--	--	--	616	(3)	--	--	--	--
Lesotho	--	--	--	--	--	--	--	--	--	--	--
Liberia	--	--	--	--	--	16	--	--	--	--	--
Libya	--	--	140	--	--	5	--	1,260	--	--	--
Madagascar	--	--	--	--	--	--	--	--	--	--	--
Malawi	--	--	--	--	--	44,230	--	--	--	--	--
Mali	--	--	--	--	--	--	11,000 <sup>e</sup>	5 <sup>e</sup>	--	--	--
Mauritania	--	--	--	--	--	--	--	--	--	--	--
Mauritius	--	--	--	--	--	--	--	--	--	--	--
Morocco and Western Sahara	--	--	--	1,100 <sup>e</sup>	3 <sup>e</sup>	1,786	8	5 <sup>e</sup>	42,200 <sup>e</sup>	9	--
Mozambique	10	555	--	--	10	63	--	--	--	--	--
Namibia	--	--	--	--	--	2,703	--	--	14,320	--	--
Niger	--	--	--	--	--	3,005	--	--	--	--	--
Nigeria	--	--	--	--	--	30 <sup>e</sup>	--	40 <sup>e</sup>	(3) <sup>e</sup>	--	--

See footnotes at end of table.

TABLE 4—Continued  
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2005<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 ore, gross weight		Iron and steel Steel, crude	Lead, mine output, Pb content (metric tons)	Manganese ore, mine output, Mn content
	Bauxite	Metal <sup>2</sup>					Iron ore, gross weight	Steel, crude			
Reunion	--	--	--	--	--	--	--	--	--	--	--
Rwanda	--	--	--	--	--	--	--	--	--	--	--
Sao Tome e Principe	--	--	--	--	--	--	--	--	--	--	--
Senegal	--	--	--	--	600 <sup>e</sup>	--	--	--	--	--	--
Seychelles	--	--	--	--	--	--	--	--	--	--	--
Sierra Leone	--	--	--	--	53	--	--	--	--	--	--
Somalia	--	--	--	--	--	--	--	--	--	--	--
South Africa	--	851 <sup>p</sup>	7,494 <sup>p</sup>	400 <sup>e</sup>	104 <sup>p</sup>	294,671 <sup>p</sup>	39,542 <sup>p</sup>	9,493 <sup>p</sup>	42,159 <sup>p</sup>	2,100 <sup>p</sup>	
Sudan	--	--	26	--	--	4,728	--	--	--	--	
Swaziland	--	--	--	--	--	--	--	--	--	--	
Tanzania	--	--	--	--	3	52,236	--	--	--	--	
Togo	--	--	--	--	--	--	--	--	--	--	
Tunisia	--	--	--	--	--	--	206 <sup>p</sup>	66 <sup>p</sup>	8,708 <sup>e</sup>	--	
Uganda	--	--	--	--	--	46	--	7 <sup>e</sup>	--	--	
Zambia	--	--	--	9,300 <sup>e</sup>	447	440	--	--	--	--	
Zimbabwe	--	--	668 <sup>p</sup>	--	3 <sup>p</sup>	14,024 <sup>p</sup>	377 <sup>p</sup>	119 <sup>e</sup>	--	--	
Total	15,900	1,760	8,330	32,800	693	522,000	55,300	17,700	107,000	4,010	
Share of world total	9%	5%	44%	57%	5%	21%	4%	2%	3%	39%	
United States	NA	2,480	--	--	1,140	261,000	54,400	93,300	426,000	--	
Share of world total	NA	7%	--	--	8%	11%	4%	8%	13%	--	
World total	172,000	37,000	18,800	57,700	15,000	2,470,000	1,530,000	1,130,000	3,360,000	10,400	

See footnotes at end of table.



TABLE 4—Continued  
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2005<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Country	Metals--Continued		Industrial minerals					Mineral fuels		
	Zinc, mine output, (metric tons)	Zn content (metric tons)	Cement, hydraulic	Diamond, natural (thousand carats) <sup>4</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		4,463 <sup>P</sup>	12,800 <sup>e</sup>	--	--	878 <sup>P</sup>	--	611,950 <sup>P</sup>	--	
Angola		--	800 <sup>e</sup>	7,000 <sup>5,6</sup>	--	--	--	456,250	--	
Benin		--	250 <sup>e</sup>	--	--	--	--	--	--	
Botswana		--	--	31,890 <sup>7</sup>	--	--	985	--	--	
Burkina Faso		--	30 <sup>e</sup>	--	--	2 <sup>e</sup>	--	--	--	
Burundi		--	--	--	--	--	--	--	--	
Cameroon		--	1,000 <sup>e</sup>	--	--	--	--	21,900	--	
Cape Verde		--	--	--	--	--	--	--	--	
Central African Republic		--	--	380 <sup>e</sup>	--	--	--	--	--	
Chad		--	--	--	--	--	--	63,300	--	
Comoros		--	--	--	--	--	--	--	--	
Congo (Brazzaville)		--	--	--	--	--	--	92,550	--	
Congo (Kinshasa)		--	410	30,300	--	--	1 <sup>e</sup>	10,000	--	
Côte d'Ivoire		--	650 <sup>e</sup>	300 <sup>e</sup>	--	--	--	14,574	--	
Djibouti		--	--	--	--	--	--	--	--	
Egypt		--	29,000	--	--	2,730	75 <sup>e</sup>	218,000 <sup>e</sup>	--	
Equatorial Guinea		--	--	--	--	--	--	144,000 <sup>e</sup>	--	
Eritrea		--	45 <sup>e</sup>	--	--	--	--	--	--	
Ethiopia		--	1,568	--	--	--	--	--	--	
Gabon		--	260 <sup>e</sup>	1 <sup>e</sup>	--	--	--	85,469	--	
Gambia, The		--	--	--	--	--	--	--	--	
Ghana		--	1,900 <sup>e</sup>	1,063	--	--	--	2,190 <sup>e</sup>	--	
Guinea		--	360 <sup>e</sup>	550	--	--	--	--	--	
Guinea-Bissau		--	--	--	--	--	--	--	--	
Kenya		--	2,123	--	--	--	--	--	--	
Lesotho		--	--	37	--	--	--	--	--	
Liberia		--	40 <sup>e</sup>	10 <sup>e</sup>	--	--	--	--	--	
Libya		--	3,600 <sup>e</sup>	--	--	--	--	620,000 <sup>e</sup>	--	
Madagascar		--	180 <sup>e</sup>	--	15,000 <sup>e</sup>	--	--	--	--	
Malawi		--	120 <sup>e</sup>	--	--	--	49 <sup>e</sup>	--	--	
Mali		--	--	--	--	--	--	--	--	
Mauritania		--	300 <sup>e</sup>	--	--	--	--	--	--	
Mauritius		--	--	--	--	--	--	--	--	
Morocco and Western Sahara		77,100	11,000 <sup>e</sup>	--	--	28,788	(3) <sup>e</sup>	245	--	
Mozambique		--	400 <sup>e</sup>	--	--	--	3	--	--	
Namibia		68,000 <sup>e</sup>	--	1,902	--	--	--	--	3,711	
Niger		--	54 <sup>e</sup>	--	--	--	183 <sup>e</sup>	--	3,647	

See footnotes at end of table.

TABLE 4—Continued  
AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2005<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Country	Metals—Continued		Industrial minerals				Mineral fuels		
	Zinc, mine output, (metric tons)	Zn content (metric tons)	Cement, hydraulic	Diamond, natural (thousand carats) <sup>4</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)
Nigeria	--	--	2,400 <sup>e</sup>	--	--	--	9 <sup>e</sup>	923,500	--
Reunion	--	--	380 <sup>e</sup>	--	--	--	--	--	--
Rwanda	--	--	100	--	--	--	--	--	--
Sao Tome e Principe	--	--	--	--	--	--	--	--	--
Senegal	--	--	1,700 <sup>e</sup>	--	--	1,455	--	--	--
Seychelles	--	--	--	--	--	--	--	--	--
Sierra Leone	--	--	172	669	--	--	--	--	--
Somalia	--	--	--	--	--	--	--	--	--
South Africa	32,112	--	--	15,776	--	2,577	245,007	7,277	795 <sup>p</sup>
Sudan	--	--	280 <sup>e</sup>	--	--	--	--	120,000	--
Swaziland	--	--	--	--	--	--	222 <sup>e</sup>	--	--
Tanzania	--	--	1,375	220	--	7	75	--	--
Togo	--	--	800 <sup>e</sup>	--	--	1,021	--	--	--
Tunisia	15,889	--	6,691	--	--	8,220	--	26,200 <sup>p</sup>	--
Uganda	--	--	630 <sup>e</sup>	--	--	--	--	--	--
Zambia	--	--	435 <sup>e</sup>	--	--	--	240 <sup>e</sup>	--	--
Zimbabwe	--	--	400 <sup>e</sup>	--	4,298	46	2,891	--	--
Total	198,000	--	82,300	90,400	19,300	45,700	250,000	3,420,000	8,150
Share of world total	2%	--	4%	46%	2%	31%	5%	13%	16%
United States	748,000	--	101,000	--	--	35,800	950,000	5,690,000	1,220
Share of world total	8%	--	4%	--	--	24%	20%	21%	2%
World total	9,560,000	--	2,310,000	196,000	1,010,000	149,000	4,850,000	26,600,000	50,900

<sup>e</sup>Estimated, estimated data, U.S. data, and world totals are rounded to no more than three significant digits. <sup>p</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 as of March 2007.

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

<sup>3</sup>Less than 1/2 unit.

<sup>4</sup>Gemstones and industrial diamond.

<sup>5</sup>Does not include smuggled production.

<sup>6</sup>Production was approximately 90% gem and 10% industrial grade.

<sup>7</sup>Assumed to contain about 70% gem and near gem.

TABLE 5  
AFRICA: HISTORIC AND PROJECTED BAUXITE MINE PRODUCTION, 1990-2011

(Thousand metric tons)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Ghana	381	513	504	726	700	700	700
Guinea	15,800	15,800	15,700	15,200	15,200	25,000	25,000
Mozambique	7	11	8	10	10	10	10
Sierra Leone	1,430	--	--	--	1,200	1,200	2,700
Total	17,600	16,300	16,200	15,900	17,100	27,000	28,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

TABLE 6  
AFRICA: HISTORIC AND PROJECTED PRIMARY ALUMINUM PRODUCTION, 1990-2011

(Thousand metric tons)

Country <sup>1</sup>	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Cameroon	93	79	86	90	90	90	260
Egypt	179	180	189	244	250	250	250
Ghana	174	135	137	13	120	120	120
Mozambique	--	--	54	555	550	690	830
Nigeria	--	--	--	--	--	100	190
South Africa	159	229	673	851	860	860	1,520
Total	600	630	1,100	1,800	1,900	2,100	3,200

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>Kenya also produced about 2,000 metric tons per year of secondary refined aluminum.

TABLE 7  
AFRICA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 1990-2011

(Metal content in thousand metric tons)

Country	1990	1995	2000	2005	2007 <sup>e</sup>	2009 <sup>e</sup>	2011 <sup>e</sup>
Botswana	25	25	35	31	35	60	90
Congo (Kinshasa)	509	29	31	92	160	490	590
Eritrea	--	--	--	--	--	--	70
Mauritania	--	--	--	--	30	30	30
Morocco	16	14	7	3	3	3	3
Namibia	28	23	6	10	25	25	25
South Africa	179	166	137	104	107	108	115
Tanzania <sup>1</sup>	--	--	--	3	4	4	4
Zambia	519	316	249	447	700	800	800
Zimbabwe	14	9	2	3	2	2	2
Total	1,300	580	470	690	1,100	1,500	1,700

<sup>e</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>Copper contained in concentrates and doré.

TABLE 8  
AFRICA: HISTORIC AND PROJECTED REFINED COPPER METAL PRODUCTION, 1990-2011<sup>1</sup>

(Thousand metric tons)

Country	1990	1995	2000	2005	2007 <sup>e</sup>	2009 <sup>e</sup>	2011 <sup>e</sup>
Botswana	--	--	--	(1)	--	5	20
Congo (Kinshasa)	339	35	--	--	--	180	340
Egypt <sup>2</sup>	4	4	4	14	14	14	14
South Africa	133	124	126	100	105	105	113
Zambia	438	328	227	398	500	800	800
Zimbabwe	14	7	10	2	--	--	--
Total	930	500	370	500	600	1,100	1,300

<sup>e</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>Pilot plant production only.

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

TABLE 9  
AFRICA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 1990-2011

(Metal content in kilograms)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Algeria	--	--	--	697	1,000	1,500	1,500
Benin <sup>1</sup>	--	300	--	20	20	20	20
Botswana	46	86	4	2,709	3,000	3,000	3,000
Burkina Faso	7,800	1,319	625	1,397	2,650	7,700	8,300
Burundi	9	2,000	--	3,905	3,900	3,900	3,900
Cameroon <sup>2</sup>	10	800	1,000	1,500	1,500	1,500	1,500
Central African Republic	241	97	15	7	10	10	10
Chad	--	--	120	150	50	50	50
Congo (Brazzaville)	7	10	10	20	10	10	10
Congo (Kinshasa)	9,300	1,180	69	4,200	4,200	7,900	11,700
Côte d'Ivoire	20	1,983	3,444	1,638	8,900	8,900	8,900
Equatorial Guinea	50	50	500	200	200	200	200
Eritrea	--	59	264	25	25	13,200	840
Ethiopia	848	4,500	3,206	3,900	5,300	5,400	5,400
Gabon	80	70	70	300	300	300	300
Ghana	16,800	53,087	72,080	66,852	88,600	100,000	100,000
Guinea	6,340	7,863	15,788	15,300	15,300	15,300	15,300
Kenya	25	170	1,243	616	600	600	600
Liberia	600	800	25	16	20	20	20
Madagascar	216	38	5	5	5	5	5
Mali	5,200	3,996	28,717	44,230 <sup>3</sup>	51,900	49,200	49,200
Mauritania	--	1,196	--	--	3,300	3,300	3,300
Morocco	500	580	505	1,786	1,800	2,700	2,700
Mozambique	63	6,800	23	63	70	70	70
Namibia	1,610	2,394	2,417	2,703	2,500	2,500	2,500
Niger	--	1,000	25	3,005	3,000	3,000	3,000
Nigeria	--	5	52	30	30	30	30
Rwanda	2,160	26	10	--	--	--	--
Senegal	--	--	550	600	600	600	600
Sierra Leone	32	4	--	53	50	50	50
South Africa	605,000	523,809	430,800	294,671	290,000	307,000	312,000
Sudan	100	3,700	5,774	4,728	4,400	2,700	--
Tanzania	3,500	320	15,060	52,236	51,000	60,000	56,000
Uganda	--	1,506	56	46	50	50	50
Zambia	129	91	600	440	--	--	--
Zimbabwe	16,900	23,959	22,069	14,024	10,000	12,000	20,000
Total	678,000	644,000	605,000	522,000	554,000	610,000	610,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>From artisanal mining.

<sup>2</sup>Excludes artisanal mining which, in 2005, was estimated to be 2,000 kilograms.

TABLE 10  
AFRICA: HISTORIC AND PROJECTED BENEFICIATED IRON ORE PRODUCTION, 1990-2011

(Metal content in thousand metric tons)

Country	Average grade <sup>1</sup>	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Algeria	50%	1,470	1,100	820	790	800	900	1,000
Egypt	55%	1,330	1,120	1,900	1,600	1,600	1,600	1,200
Liberia	57% to 64%	2,490	--	--	--	--	--	--
Mauritania	59% to 72%	6,800	7,000	7,500	7,200	7,200	7,200	7,200
Morocco	54%	90	32	4	4	4	4	4
Nigeria	36%	138	62	9	--	500	1,800	1,800
Senegal	42% to 59%	--	--	--	--	--	--	6,300
South Africa	62% to 65%	19,800	19,800	21,570	24,900	25,500	35,000	44,100
Tanzania	32%	--	14	--	--	--	--	--
Tunisia	54%	154	122	98	108	90	70	50
Uganda	61% to 67%	--	--	3	--	--	--	--
Zimbabwe <sup>2</sup>		730	160	225	185	150	120	200
Total		33,000	29,400	32,100	34,800	35,800	46,700	61,900

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to total shown. -- Negligible or no production.

<sup>1</sup>Direct shipping ore and concentrate.

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

TABLE 11  
AFRICA: HISTORIC AND PROJECTED CRUDE STEEL PRODUCTION, 1990-2011<sup>1</sup>

(Thousand metric tons)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Algeria	836	827	842	1,007	1,700	1,700	2,500
Angola	10	--	--	--	--	--	--
Benin	8	--	--	--	--	--	--
Congo (Kinshasa)	NA	NA	159	130	130	130	130
Egypt	2,240	2,642	2,838	5,600	5,600	5,600	5,600
Kenya	20	20	--	--	--	--	--
Libya	492	909	1,055	1,260	1,300	1,300	1,300
Mauritania	NA	NA	5	5	5	5	5
Morocco	7	7	5	5	5	5	5
Nigeria	220	36	--	40	1,000	2,000	2,400
South Africa	8,620	8,741	8,481	9,493	10,700	11,300	11,700
Tunisia	177	201	237	66	80	200	200
Uganda	--	12	7	7	7	7	7
Zimbabwe	580	210	258	119	100	80	250
Total	13,200	13,600	13,900	17,700	20,600	22,300	24,100

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

NA Not available.

TABLE 12  
AFRICA: HISTORIC AND PROJECTED LEAD MINE PRODUCTION, 1990-2011<sup>1</sup>

(Metal content in metric tons)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Algeria	1,100	1,383	818	--	--	--	--
Morocco	68,800	67,708	81,208	42,200	42,000	42,000	42,000
Namibia	18,000	16,084	11,114	14,320	13,400	15,300	--
Nigeria	NA	NA	165	200	100	100	100
South Africa	69,400	88,449	75,262	42,159	42,000	42,000	42,000
Tunisia	2,970	6,601	6,602	8,708	--	--	--
Total	160,000	180,000	175,000	108,000	98,000	99,000	84,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.  
NA Not available.

TABLE 13  
AFRICA: HISTORIC AND PROJECTED PRIMARY REFINED LEAD PRODUCTION, 1990-2011

(Metric tons)

Country <sup>1</sup>	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Algeria	1,000	800	6,100	5,000	--	--	--
Morocco	64,000	59,673	66,812	35,000	35,000	35,000	35,000
Namibia	35,100	26,752	--	--	--	--	--
Total	100,000	87,200	72,900	40,000	35,000	35,000	35,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.  
<sup>1</sup>Nigeria also refines a small quantity of primary lead.

TABLE 14  
AFRICA: HISTORIC AND PROJECTED SECONDARY REFINED LEAD PRODUCTION, 1990-2011

(Metric tons)

Country <sup>1</sup>	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Algeria	3,500	7,500	--	--	--	--	--
Kenya	2,400	2,000	1,000	1,000	1,000	1,000	1,000
Morocco	2,000	2,600	3,000	4,000	4,000	4,000	4,000
Nigeria	--	4,000	5,000	5,000	5,000	5,000	5,000
South Africa	31,200	32,100	46,200	64,000	70,000	70,000	70,000
Total	39,100	48,200	55,200	74,000	80,000	80,000	80,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.  
<sup>1</sup>Egypt and Uganda also refine small quantities of secondary lead.

TABLE 15  
AFRICA: HISTORIC AND PROJECTED NICKEL MINE PRODUCTION, 1990-2011

(Metal content in metric tons)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>e</sup>	2011 <sup>c</sup>
Botswana	23,200	18,088	38,420	39,305	38,000	38,000	25,000
Madagascar	--	--	--	--	--	20,000	60,000
Morocco	NA	NA	84	499	500	500	500
South Africa	29,000	30,700	36,616	42,392	49,000	49,000	76,000
Zambia	--	--	--	--	--	4,000	8,500
Zimbabwe	13,500	11,721	8,160	8,556	9,500	9,000	9,500
Total	65,700	60,500	83,300	90,800	97,000	120,000	180,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.  
NA Not available.

TABLE 16  
AFRICA: HISTORIC AND PROJECTED PLATINUM MINE PRODUCTION, 1990-2011

(Metal content in kilograms)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>e</sup>	2011 <sup>c</sup>
South Africa	87,800	102,300	114,459	163,711	182,000	190,000	197,000
Zimbabwe	21	7	505	4,834	5,600	8,000	11,000
Total	87,800	102,000	115,000	169,000	187,000	198,000	208,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 17  
AFRICA: HISTORIC AND PROJECTED PALLADIUM MINE PRODUCTION, 1990-2011

(Metal content in kilograms)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>e</sup>	2011 <sup>c</sup>
South Africa	38,300	51,000	55,818	82,961	94,000	99,000	105,000
Zimbabwe	31	17	366	3,879	4,500	6,500	9,000
Total	38,300	51,000	56,200	86,800	98,500	106,000	114,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 18  
AFRICA: HISTORIC AND PROJECTED ZINC MINE PRODUCTION, 1990-2011

(Metal content in metric tons)

Country <sup>1</sup>	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>e</sup>	2011 <sup>c</sup>
Algeria	4,160	7,174	10,452	4,463	4,500	3,000	3,000
Congo (Kinshasha)	61,800	4,500	--	15,000	20,000	20,000	20,000
Morocco	18,800	79,947	103,064	77,100	130,000	130,000	130,000
Namibia	37,700	30,209	39,126	68,000	75,000	65,000	--
South Africa	75,000	70,241	63,590	32,112	31,000	31,000	31,000
Tunisia	3,960	44,244	41,247	15,889	--	--	--
Total	201,000	236,000	257,000	213,000	260,000	250,000	185,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>Nigeria also mined a small quantity of zinc.



TABLE 19  
AFRICA: HISTORIC AND PROJECTED ZINC METAL PRODUCTION, 1990-2011

(Metric tons)

Country <sup>1</sup>	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Algeria	23,600	30,000	34,000	30,000	30,000	30,000	30,000
Congo (Kinshasha)	38,200	--	--	--	--	--	--
Namibia	--	--	--	120,533	150,000	150,000	150,000
South Africa	92,000	98,782	103,000	102,000	92,000	92,000	92,000
Total	154,000	129,000	137,000	253,000	270,000	270,000	270,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>Nigeria also refined a small quantity of zinc.

TABLE 20  
AFRICA: HISTORIC AND PROJECTED DIAMOND PRODUCTION, 1990-2011

(Thousand carats)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Angola <sup>1,2</sup>	1,130	2,900	4,313	7,000	7,900	10,000	10,000
Botswana	17,400	16,802	24,635	31,890	31,000	30,000	33,000
Cameroon	NA	NA	NA	12	12	12	12
Central African Republic	381	530	464	380	400	400	400
Congo (Brazzaville)	NA	NA	50	50	50	50	50
Congo (Kinshasa)	19,400	22,024	16,006	30,300	29,400	31,500	32,200
Côte d'Ivoire	12	75	320	300	300	300	300
Gabon	1	1	1	(3)	(3)	(3)	(3)
Ghana	650	632	878	1,063	1,000	1,000	1,000
Guinea	127	365	327	550	500	500	500
Lesotho	NA	NA	2	37	370	390	390
Liberia	100	150	170	10	10	10	10
Namibia	763	1,382	1,552	1,902	2,100	4,000	9,000
Sierra Leone	78	214	77	669	670	670	670
South Africa	8,710	9,683	10,790	15,776	15,800	16,000	16,000
Tanzania	85	50	354	220	290	1,100	1,110
Zimbabwe	--	204	23	251	230	300	300
Total	48,800	55,000	60,000	90,400	90,000	96,000	105,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to total shown. NA Not available.

-- Negligible or no production.

<sup>1</sup>Does not include smuggled production.

<sup>2</sup>Production was about 90% gem and 10% industrial grade.

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

TABLE 21  
AFRICA: HISTORIC AND PROJECTED PHOSPHATE ROCK PRODUCTION, 1990-2011

(P<sub>2</sub>O<sub>5</sub> content in thousand metric tons)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Algeria	333	500	265	260	400	350	300
Burkina Faso	NA	NA	NA	1	1	1	1
Egypt	286	207	317	800	800	800	800
Mali	2	1	--	--	--	--	--
Morocco	6,910	6,399	7,200	9,195	9,200	9,500	9,500
Senegal	823	556	626	466	500	500	500
South Africa	1,200	1,101	1,083	1,000	1,000	1,000	1,000
Tanzania	8	2	2	1	1	1	1
Togo	840	930	490	368	400	400	400
Tunisia	1,860	2,181	2,500	2,500	2,400	2,400	2,300
Zimbabwe	52	45	25	14	15	15	25
Total	12,300	11,900	12,500	14,600	14,700	15,000	14,800

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.  
NA Not available.

TABLE 22  
AFRICA: HISTORIC AND PROJECTED SALABLE COAL PRODUCTION, 1990-2011

(Thousand metric tons)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Botswana	793	898	947	985	1,000	1,200	5,200
Congo (Kinshasa)	100	10	--	1	1	1	1
Egypt	--	10	39	75	75	75	75
Malawi	41	15	34	49	96	96	96
Morocco	526	650	31	(1)	(1)	(1)	(1)
Mozambique	40	40	16	3	40	40	14,000
Niger	154	135	158	183	180	180	180
Nigeria	78	29	12	9	10	50	50
South Africa	175,000	206,210	224,118	245,007	261,000	270,000	276,000
Swaziland	151	172	178	222	220	220	220
Tanzania	52	43	79	75	110	150	150
Zambia	382	141	168	240	250	250	250
Zimbabwe	5,500	5,538	3,809	2,891	2,500	2,500	4,000
Total	183,000	214,000	230,000	250,000	265,000	275,000	300,000

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

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

TABLE 23  
AFRICA: HISTORIC AND PROJECTED URANIUM MINE PRODUCTION, 1990-2011

(Metal content in metric tons)

Country	1990	1995	2000	2005	2007 <sup>c</sup>	2009 <sup>c</sup>	2011 <sup>c</sup>
Gabon	702	653	--	--	--	--	--
Malawi	--	--	--	--	--	1,300	1,300
Namibia	3,214	2,006	2,714	3,147	4,500	5,000	5,300
Niger	2,681	2,970	2,898	3,093	3,100	3,100	3,100
South Africa	2,442	1,443	861	674	1,400	2,300	2,500
Total	9,000	7,100	6,500	6,900	9,000	11,700	12,200

<sup>c</sup>Estimated; estimated data and totals are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.