



2015 Minerals Yearbook

SUDAN [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF SUDAN

By Mowafa Taib

Sudan supplied the world with gold, chromite, crude petroleum, and petroleum products in 2015. Other mineral commodities produced in Sudan included cement, feldspar, gypsum, iron ore, kaolin, manganese, marble, salt, and silver. Sudan, which is the third largest country in Africa in terms of area after Algeria and the Democratic Republic of the Congo [Congo (Kinshasa)], covers 1.88 million square kilometers (table 1; Central Bank of Sudan, 2016, p. 139; Mohammed, 2016; U.S. Central Intelligence Agency, 2016).

Sudan's Ministry of Minerals (MOM) identified seven mineral districts in the country as having potential for mining operations. These districts were, in descending order from north to south, the Red Sea Hills, the Beyoda desert, the Jebel Marra volcanic field, the Jebel Rahib region, the Jebel Abyad region, the Ingessana polymetallic complex, the Nuba Mountains, and the Hofrat An-Nuhas [the copper pit]. The Red Sea Hills district in northeastern Sudan hosts copper, gold, iron ore, rare-earth elements, silver, and zinc metal occurrences as well as black sands, garnet, gypsum, salt, and talc deposits. Estimates of major mineral resources in the Red Sea Hills area included 500,000 metric tons (t) of contained copper, 150 t of contained gold, 4,500 t of silver, and 1.9 million metric tons (Mt) of contained zinc.

The Beyoda desert in north-central Sudan contains gold, feldspar, iron ore, kainite (aluminum silicate), marble, mica, manganese, and silica deposits. The Jebel Marra volcanic field, which is located in western Sudan, hosts deposits of base metals, garnet, kainite, salt, and sulfur. The Jebel Rahib and Jebel Abyad regions in Wadi Hawar in Northern State host bauxite, chromite, gold, and platinum-group metals (PGM) deposits. The Ingessana polymetallic complex in Blue Nile State in southeastern Sudan hosts asbestos, chromite, gold, magnesite, marble, and talc occurrences. The Nuba Mountains in southern Kordofan host such metallic minerals as chromite, copper, gold, iron ore, manganese, and nickel; such industrial minerals as graphite, marble, phosphate rock, and talc; and the mineral fuel uranium.

The Hofrat An-Nuhas mineral district in South Darfur in the southwest has several copper, gold, precious and semiprecious stones, and uranium deposits (Ministry of Minerals, 2014, p. 10–11, 14–16, 18; Abu Fatima, 2016, p. 11–12).

Minerals in the National Economy

Sudan's real gross domestic product (GDP) increased by 4.9% in 2015 compared with an increase of 2.7% (revised) in 2014. The value added of the industrial sector, which included mining and quarrying and production of petroleum, electricity, and water resources, increased at constant prices by 4.5% and accounted for 23.0% of the GDP in 2015 compared with 23.1% in 2014. The value added of the petroleum sector, which accounted for 2.0% of the country's GDP in 2015 compared with 2.3% in 2014, decreased by 10.0% in 2015 compared with a decrease of 6.6% in 2014. The value added of the mining and

quarrying sector, which contributed 0.7% to the GDP in 2015 compared with 0.8% in 2014, decreased by 12.4% in 2015 compared with an increase of 11.4% in 2014. The value added of the construction sector, which contributed 3.5% to the GDP in 2014 and 2015, increased by 6.0% in 2015 compared with an increase of 5.8% in 2014 (Central Bank of Sudan, 2016, p. 118).

In 2015, Sudan's exports decreased by 28.8% to \$3.17 billion from \$4.45 billion in 2014. Mineral exports, which included crude petroleum, gold, and other minerals and refinery products accounted for about 44% of the country's total exports. In 2015, gold exports decreased in value to \$726 million from about \$1.3 billion in 2014 and in tonnage to 19.4 t from 30.4 t. In 2015, crude petroleum exports decreased in value and volume to \$574 million and 12.1 million barrels (Mbbbl), respectively, from \$1.2 billion and 12.8 Mbbbl, respectively, in 2014. Exports of refined petroleum products decreased in value and volume to \$53 million and 84,086 t, respectively, in 2015 from \$163 million and 174,046 t, respectively, in 2014. The United Arab Emirates, China, Saudi Arabia, and Egypt were Sudan's major export partners in 2015 and accounted for 23.4%, 23.3%, 20.8%, and 9.6% of total exports, respectively (Central Bank of Sudan, 2016, p. 161, 174).

Government Policies and Programs

Presidential Decree nos. 22 of 2010, 22 of 2012, and 45 of 2013, designated the MOM as the Government agency responsible for mineral exploration and geologic surveys in Sudan. The MOM implemented Government policies and programs and promoted investment in the mining sector. The Mineral Resources and Mining Development Law of 2007 states that the Government has ownership and absolute rights to explore for and mine all mineral commodities in the country. The Mineral Resources and Mining Development Law of 2007 also defines traditional mining (artisanal mining) as mining activities carried out by groups and individuals without the use of heavy machinery to a maximum depth of 20 meters (m) (Abd Al Rahman, 2014; Abu Fatima, 2016, p. 3–5).

After the commissioning of the country's first gold refinery in 2012, the Government had banned the export of unrefined gold to increase the Central Bank of Sudan's holdings of gold reserves. In 2014, the Government estimated that more than 75% of the country's gold production was carried out by artisanal miners and that 85% of the output was smuggled out of the country (Sudan Tribune, 2014).

On October 28, 2015, the U.S. Government extended sanctions against Sudan for another year, citing actions and policies of the Government of Sudan that continued to present a threat to U.S. foreign policy and national security. The United States sanctions against Sudan were initiated in 1997. Executive Order 13067 imposed a trade embargo on Sudan and blocked assets of the Government of Sudan. In 2006, Executive Order 13412 banned most of the transactions related but not

limited to Sudan's petroleum and petrochemical industries by United States individuals and organizations, including but not limited to oilfield services and oil or gas pipelines (U.S. Department of the Treasury, Office of Foreign Assets Control, 2013; White House, The, 2015).

Production

Notable increases in mineral production in 2015 compared with production in 2014 included that of feldspar, which increased by 86%; chromite, by 63%; manganese ore, by 57%; iron ore, by 50%; petroleum coke, by 21%; and gold by 12%. Notable decreases in production included that of kaolin, by 57%; salt, by 37%; crude petroleum and condensate, by 13%; and gypsum, by 10%. Although no production of fluorite, mica, quartz, and zinc was reported by the Central Bank of Sudan, the MOM reported production of more than 500,000 t each of dimension stone and marble for use in cement manufacturing as well as unspecified quantities of feldspar, fluorite, talc, and white sands in 2015 (table 1; Abu Fatima, 2016, p. 37; Central Bank of Sudan, 2016, p. 139).

Structure of the Mineral Industry

The Government owned several mining companies in Sudan, including Ariab Mining Co. (AMC), which operated the Hassai gold mine in northern Sudan; Sheriek Mica Mines Co., which produced chromite, gypsum, and mica; Sudan Gold Refinery Co. Ltd.; and Ingessana Hills Mining Corp. (a subsidiary of Sudanese Mining Co.), which produced chromite. Cement plants were privately owned. Crude petroleum production in Sudan was carried out by joint ventures of state-owned companies from China, India, Malaysia, and Sudan. The Government also owned three petroleum refineries, but the country's largest refinery, Khartoum Oil Refinery Co. Ltd., was a joint venture between China National Petroleum Corp. (CNPC) and Sudan Petroleum Corp. (table 2).

In 2015, 239 small-scale companies held mining licenses for the production of metals and industrial mineral commodities in Sudan, including chromite (117); gold (49); salt (37); gypsum (30); marble (26); manganese (14); mica (11); iron ore (8); feldspar (6); quartz (5); white sand (4); copper, fluorite, and talc (2 each); and bentonite and kaolin (1 each). The recent gold rush in Sudan created opportunities for several startup companies that provided various services and supplies related to artisanal gold production. Thirty-four tailings-processing companies were engaged in mineral exploration and production, of which 12 large-scale companies, 43 small-scale companies, and 15 tailings-processing companies were active in minerals (mainly gold) production, and 2 large-scale companies and 6 tailings-processing companies were involved in pilot projects (Elsamani, 2015, p. 15; Ibrahim, 2015, p. 7; Abu Fatima, 2016, p. 32).

Commodity Review

Metals

Chromite.—Ingessana Hills Mining Corp. produced chromite from the Ingessana Hills ophiolite, which is located in

Blue Nile State in southeastern Sudan. Chromite (gross weight) output increased significantly to 100,000 t in 2015 from about 61,000 t in 2014. Chromite mineral resources in Sudan were estimated to be about 1 Mt grading up to 60% Cr₂O₃. Chromite occurrences were found in the Red Sea region in northeastern Sudan, the Nuba Mountains in southern Sudan, and in Northern State (tables 1, 2; Ministry of Minerals, 2014, p. 36; Central Bank of Sudan, 2016, p. 139).

Copper, Gold, and Zinc.—The Central Bank of Sudan reported that Sudan produced 82,400 kilograms (kg) of gold in 2015 compared with 73,300 kg in 2014. According to the MOM, gold produced by mining companies increased by 53% to 14,800 kg in 2015 from 9,700 kg in 2014, and that by artisanal miners, by 6% to 67,500 kg from 63,700 kg (Central Bank of Sudan, 2016, p. 139; Mohammed, 2016, p. 47).

Artisanal miners accounted for most of Sudan's gold production; they were required to sell their gold production directly to the Central Bank of Sudan, which in turn transferred it to the country's gold refinery in Khartoum. Most of the gold produced by artisanal miners in Sudan, however, was thought to have been smuggled out of the country. Sudan's gold exports decreased to 19,389 kg in 2015 from 30,445 kg in 2014. The remainder was held either by the Central Bank of Sudan as gold reserves or by Sudanese corporations and individuals as an investment (Ushaeik Mohamed Taher, State Minister of Minerals, Sudan, personal commun., October 6, 2015). The Government estimated that artisanal miners produced more than 200,000 kg of gold between 2011 and 2015 and that nearly 100,000 kg would be produced by artisanal miners in 2016 (Sudan Tribune, 2014; Abu Fatima, 2016, p. 33; Central Bank of Sudan, 2016, p. 89, 139, 161).

In 2015, the companies that produced gold in Sudan included AMC, Delgo Minerals Co., Alliance for Mining Co. Ltd., Golden United Group, Hagagia (Poly Red Sea) Gold Mining Co. Ltd., Huakan Mining Co. of China, Managem Group of Morocco, Omdurman Mining Co., Rida Mining Co., Sahari Company for Gold Mining, and Tahe International Metal Mining Corp. of the British Virgin Islands (table 2; Ministry of Minerals, 2014, p. 51–55).

In 2015, the Government became the sole owner of AMC after completing the acquisition of La Mancha's 44% share in the company. AMC operated the Hassai Mine in northeastern Sudan, which was the leading large-scale open pit gold mine in the country. AMC increased its gold production to 1,866 kg in 2015 from 1,775 kg in 2014 and 1,546 kg in 2013. AMC had produced more than 80,000 kg of gold from the Hassai Mine since 1992 by mining the upper gold-rich oxidized cap rock of multiple deposits. The company expected to continue mining at the site for 2 more years. AMC planned to explore for gold at depth at the Hassai site owing to the impending depletion of near-surface deposits. AMC completed a definitive feasibility study to build a carbon-in-leach plant to treat tailings accumulated during more than 30 years of mining; it also completed a prefeasibility study to build a flotation plant to treat the volcanic massive sulfide (VMS) ore deposits underlying the current open pits. AMC projected that it would produce 19,362 kg of gold and 93,060 kg of silver during the next 5 years. The VMS project was expected to include the

mineral resources at the Hadal Awatib East, the Hadayamet, and the Hassai South properties, which were estimated to contain 117 Mt grading 1.22 grams per metric ton (g/t) gold, 1.12% copper, and 0.67% zinc. Mineral resources at the Hadal Awatib East deposit were estimated to be 67.5 Mt containing 74,764 kg of gold, 706 t of copper, and 508 t of zinc. Mineral resources at the Hassai South were estimated to be about 42 Mt containing 61,329 kg of gold, 525 t of copper, and 122 t of zinc, and those at the Hadayamet site were estimated to be 7.8 Mt containing 7,236 kg of gold, 79 t of copper, and 784 t of zinc (Abdalla, 2015, p. 14, 17–19; Ariab Mining Co., 2016).

Managem Group of Morocco increased its production of gold to 503 kg in 2015 from 390 kg in 2014 from its pilot project at Wadi Gadgaba in mining Block 15, which is located in Red Sea State in northeastern Sudan. Managem continued exploration for gold in Blocks 9 and 24 through its subsidiary MCM Sudan. The company planned to start construction of a new gold mine at mining Block 15 after completing a feasibility study (Abu Fatima, 2016, p. 26; Managem Group, 2016, p. 46).

In February, Orca Gold Inc. of Canada announced the results of its second drilling program at the Galat Sufar South (GSS) and the Wadi Doum (WD) prospects in Block 14 in northeastern Sudan. In 2015, the combined indicated and inferred mineral resources at the GSS and WD deposits at a cutoff grade of 1.0 g/t were estimated to be 27.7 Mt at a grade of 1.80 g/t gold and 11.4 Mt at a grade of 1.7 g/t gold, respectively (Abu Fatima, 2016, p. 25; Orca Gold Inc., 2016).

Take International operated the Abu Sara gold mine in Block 17 at Hamasana in Red Sea State. Mineral resources at the mine were estimated to be 4.7 Mt grading 3.07 g/t gold. The company estimated that 108,860 kg (3.5 million troy ounces) of gold could be produced from the mine based on available drilling and geologic information (Take International Metal Mining Corp., 2015).

Sahari Company for Gold Mining began gold production in the Berber district in Nile River State in 2015. Sahari, along with AMC and Rida Mining Co., was among the first companies to be awarded a gold mining permit in Sudan. Sahrai's concession area covered 2,600 square kilometers and was estimated to contain 14,500 kg of gold among eight mines. The company invested \$29 million and used a carbon-in-leach gold recovery plant to minimize potential environmental hazards (Ministry of Minerals, 2013).

Alliance for Mining Co. Ltd. was created in 2014 between Kush for Exploration and Production Co. Ltd. of Russia and the Government to develop gold resources in Block 30 in Red Sea State. In May 2015, Alliance completed the construction of a new gold-processing plant that had the capacity to handle 150,000 metric tons per year (t/yr) of ore. The plant's capacity would be increased to 200,000 t/yr in 2016. The plant used cyanide-leaching technology and achieved a 90% gold recovery rate. In 2015, Alliance produced nearly 700 kg of gold and expected to increase its production to more than 1,700 kg in 2016 (Sudan Tribune, 2015; Sudan Vision, 2015; Abu Fatima, 2016, p. 27; Alliance for Mining Co. Ltd., 2016).

Iron Ore.—Sudan has been producing modest quantities of iron ore with iron (Fe) content of between 40% and 68%. In 2015, iron ore output increased to 70,000 t from 46,579 t

in 2014. Sudan's General Authority for Geological Research (GRAS) evaluated the main iron ore deposits in the country, including the Gaab and the Bagrawiya oolitic iron ore deposits in northern Sudan. The Gaab deposit was estimated to contain 15 billion metric tons (Gt) of ore grading 45% Fe, and that of the Bagrawiya deposit was estimated to contain 5 Gt of ore grading 40% Fe. The Argin and Wadi Halfa oolitic iron ore deposit in the Northern State was estimated to host 100 Mt of ore grading 40% iron (table 1; Mohammed Ali, 2014, p. 5, 9).

Industrial Minerals

Cement.—Sudan's output of cement increased by 11% to more than 3.7 Mt in 2015 from about 3.4 Mt in 2014. Sudan had eight major cement plants in operation with a total capacity of more than 7.4 million metric tons per year. The MOM listed four additional plants in River Nile State, including the Bee Cement Factory, Heleith Cement Factory, MAM Cement Factory, and Raira Cement Factory, but information on major operating companies and (or) their locations and capacities was not available. In 2015, Atbara Cement Co. Ltd., which was a subsidiary of Al-Rahji Group of Saudi Arabia, produced 1.2 Mt of cement; Al-Shamal Cement Factory, 1.1 Mt; ASEC Cement Co. of Egypt (a subsidiary of Qalaa Holdings S.A.E. of Egypt), 737,700 t; Barber Cement Co., 369,600 t; Al-Salam Cement Production Company Ltd., 106,000 t; Aslan Cement Co., 35,800 t; and Nile Cement Company Ltd., 84,900 t (Central Bank of Sudan, 2016, p. 141–143; Ministry of Minerals, 2016).

Stone, Dimension.—According to the latest available MOM reports, Sudan produced about 500,000 t/yr of dimension stone. Earlier reports however, included much less output for dimension stone (50,000 t/yr). An estimated 1,000 cubic meters of marble was produced in Sudan in 2015 (compared with 900 cubic meters in 2014) according to the Central Bank of Sudan's statistics. The MOM, however, reported production of more than 500,000 t of marble for use in cement plants. The major marble occurrences in Sudan are located in the Derdudeib, Marsh Arkuyai, and Minan regions in Red Sea State, the Es Semeih area in Northern Kordofan State, the area of Nayfer er Rugaying in White Nile State, the area of Rashad in Southern Kordofan State, and the area of West Berber-Atbara in River Nile State (Abu Fatima, 2016, p. 37; Central Bank of Sudan, 2016, p. 139).

Mineral Fuels

Petroleum.—In 2015, Sudan's production of crude petroleum and condensate decreased to 38.3 Mbbl from 43.8 Mbbl in 2014. Production of refined petroleum products increased to 32.7 Mbbl in 2015 from 31.1 Mbbl in 2014 (table 1). The joint venture of Greater Nile Petroleum Operating Co. (CNPC) (40%), Petronas Carigali Overseas Shd. Bhd. of Malaysia (30%), ONGC Videsh Ltd. of India (25%), and Sudan Petroleum Company Ltd. (Sudapet) (5%) produced crude petroleum in Blocks 1, 2, and 4 in West Kordofan State in south-central Sudan. After the referendum on South Sudan's independence from Sudan, Blocks 1, 2, and 4 were divided between Sudan and

South Sudan. Sudan kept Block 2 and Block 4 and South Sudan kept Block 1. The Bamboo, Bamboo West (Block 2), Diffra (Block 4), Hadida (Block 6), Heglig (Block 2), and Neem Taiyib (Block 4) oilfields are located in Sudan. In late 2014, Staroil Operation Co. Ltd. [Ansan Wikfs Investments Ltd. of Yemen (66%) and Sudapet, (34%)] commenced crude petroleum production at the Al-Barasaya oilfield in Block 17 at the rate of 11,000 billion barrels per day (bbl/d). The company increased production to 20,000 bbl/d in 2015 from 15 wells. In 2015, the company had six active rigs and 100 kilometers of pipeline (U.S. Energy Information Administration, 2014, p. 6, 8–9; Central Bank of Sudan, 2016, p. 137).

The Khartoum oil refinery at Al-Jali in northern Sudan was operated by CNPC and had the capacity to produce 100,000 bbl/d. The Port Sudan refinery was owned by the Government and had the capacity to produce 21,700 bbl/d. The country also had four small-scale refineries (topping plants), including the El-Obeid refinery, which had the capacity to produce 10,000 bbl/d; the Shajirah refinery (10,000 bbl/d); and the Abu Gabra refinery (2,000 bbl/d). The Government planned to increase the capacity at the Khartoum oil refinery to 200,000 bbl/d, and those of the Port Sudan and El-Obeid refineries, to 50,000 bbl/d each (U.S. Energy Information Administration, 2014, p. 9, 13; Khartoum Refinery Co. Ltd., 2016).

Outlook

Although Sudan's gold resources have attracted several mining companies from such countries as Canada, Egypt, Morocco, Russia, and Turkey, gold mining is expected to remain the focus of the Government's plan to offset lost revenue from petroleum production in South Sudan, which became an independent state in 2011. The Government projected that Sudan's gold production would reach a record high of 100,000 kg in 2016, which could place the country among Africa's leading gold producers (Africa Intelligence, 2014).

References Cited

- Abdalla, M.A., 2015, The experience of a sustainable local mining industry (Au, Ag, Cu, Zn): United Nations Conference on Trade and Development presentation at the 17th Africa Oil, Gas and Mines Trade and Finance Conference and Exhibition, Khartoum, Sudan, November 23–26, 32 p. (Accessed March 23, 2016, at <http://unctad.org/meetings/en/Presentation/17OILGASMINE-Mohamed-Abufatima-Abdalla-S6.pdf>.)
- Abd Al Rahman, W.K.A., 2014, Traditional mining and the law: Khartoum, Sudan, Ministry of Minerals, presentation at the Traditional Mining Conference, May, 28 p.
- Abu Fatima, M., 2016, Geology and minerals potential of the Sudan investment opportunities, *in* Mine Africa at PDAC 2016 report: MineAfrica Inc., 47 p. (Accessed September 6, 2016, at <http://www.mineafrica.com/documents/B1%20-%20Sudan.ppt>.)
- Africa Intelligence, 2014, Khartoum wants tighter hold on gold bonanza: Africa Energy Intelligence, no. 706, October 28. (Accessed August 26, 2015, at <http://www.africaintelligence.com/AMA/exploration-production/2014/10/28/khartoum-wants-tighter-hold-on%20A0gold-bonanza,108044533-GR.A>.)
- Alliance for Mining Co. Ltd., 2016, Company profile: Alliance for Mining Co. Ltd. (Accessed September 6, 2016, at <http://alliance-kush.com>.)
- Ariab Mining Co., 2016, Operations: Ariab Mining Co. Web page. (Accessed July 25, 2016, at <http://ariabmining.net/index.php/en/pages/details/8/6>.)
- Central Bank of Sudan, 2016, Annual report 2015: Khartoum, Sudan, Central Bank of Sudan, 220 p. (Accessed July 26, 2016, at https://www.cbos.gov.sd/sites/default/files/annual-2015-arabic_0.pdf.)
- Elsamani, Yousif, 2015, Minerals potentials and resources in Sudan: United Nations Conference on Trade and Development presentation at the 17th Africa Oil, Gas and Mines Trade and Finance Conference and Exhibition, Khartoum, Sudan, November 23–26, 27 p. (Accessed March 23, 2016, at <http://unctad.org/meetings/en/Presentation/17OILGASMINE-Dr-Yousif-Elsamani-S1.pdf>.)
- Ibrahim, M.S., 2015, Artisanal mining in Sudan—Opportunities, challenges and impacts: United Nations Conference on Trade and Development presentation at the 17th Africa Oil, Gas and Mines Trade and Finance Conference and Exhibition, Khartoum, Sudan, November 23–26, 33 p. (Accessed March 23, 2016, at <http://unctad.org/meetings/en/Presentation/17OILGASMINE-Mohamed-Sulaiman-Ibrahim-S4.pdf>.)
- Khartoum Refinery Co. Ltd., 2016, Overview: Khartoum Refinery Co. Ltd. (Accessed February 15, 2017, at <http://www.krcsd.com/English/about.asp?levelNo=54&id=209>.)
- Managem Group, 2016, Rapport annuel 2015: Managem Group, March, 128 p. (Accessed July 25, 2016, at <http://www.managemgroup.com/content/download/1297/8535/file/Managem%20-%20Rapport%20Annuel%202015.pdf>.)
- Ministry of Minerals, 2013, The vice president inaugurates the production of Sahari Company for Mining next Saturday: Khartoum, Sudan, Ministry of Minerals. (Accessed August 26, 2015, at <http://www.minerals.gov.sd/Eng/news.htm#>.)
- Ministry of Minerals, 2014, The field of mineral potential of the Sudan: Khartoum, Sudan, Ministry of Minerals, 57 p. (Accessed August 26, 2015, at http://www.minerals.gov.sd/Eng/doc/Mineral_en.pdf.)
- Ministry of Minerals, 2016, Atbara office: Khartoum, Sudan, Ministry of Minerals. (Accessed September 6, 2016, at http://minerals.gov.sd/Eng/Atbara_Office.htm.)
- Mohammed Ali, N.E., 2014, Iron, *in* Sudan—Syndication geological studies: Khartoum, Sudan, Ministry of Minerals, 22 p. (Accessed August 21, 2015, at http://www.minerals.gov.sd/Eng/doc/steel_en.pdf.)
- Mohammed, A.M., 2016, Sudan's mineral potential: The Mining Show, 9th, Dubai, United Arab Emirates, October 5–6, 2016, Presentation, unpaginated.
- Orca Gold Inc., 2016, Sudan exploration: Orca Gold Inc., 34 p. (Accessed July 26, 2016, at <http://www.orcagold.com/s/sudan-exploration.asp>.)
- Sudan Tribune, 2014, 75% of Sudan's gold production is smuggled—Official: Sudan Tribune [Khartoum, Sudan], June 9. (Accessed August 21, 2015, at <http://sudantribune.com/spip.php?article51288>.)
- Sudan Tribune, 2015, Sudan to sign “unprecedented” gold exploration agreement with Russian company: Sudan Tribune [Khartoum, Sudan], July 28. (Accessed August 27, 2015, at <http://www.sudantribune.com/spip.php?article55855>.)
- Sudan Vision, 2015, Russian companies to begin gold production in Sudan: Sudan Vision [Khartoum, Sudan], January 13. (Accessed August 26, 2015, at <http://www.news.sudanvisiondaily.com/details.html?rsnpid=244982>.)
- Tahe International Metal Mining Corp., 2015, Abu Sara gold mine: Tahe International Metal Mining Corp. (Accessed August 26, 2015, at <http://www.tahemining.com>.)
- U.S. Central Intelligence Agency, 2016, Country comparison—Area, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed September 6, 2016, at <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2147rank.html>.)
- U.S. Department of the Treasury, Office of Foreign Assets Control, 2013, Sudan sanctions program: U.S. Department of the Treasury, Office of Foreign Assets Control, November 5. (Accessed November 21, 2014, at <http://www.treasury.gov/resource-center/sanctions/Programs/Documents/sudan.pdf>.)
- U.S. Energy Information Administration, 2014, South Sudan and Sudan: U.S. Energy Information Administration Country Analysis Brief, September 3, 16 p. (Accessed August 28, 2015, at http://www.eia.gov/beta/international/analysis_includes/countries_long/Sudan_and_South_Sudan/sudan.pdf.)
- White House, The, 2015, Notice—Continuation of the national emergency with respect to Sudan: The White House, October 28. (Accessed July 25, 2016, at <https://www.whitehouse.gov/the-press-office/2015/10/28/notice-continuation-national-emergency-respect-sudan>.)

TABLE 1
SUDAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2011	2012	2013	2014	2015
METALS					
Chromite:					
Gross weight	64,128	75,000	30,870	61,334	100,000
Cr ₂ O ₃ content	26,934	31,500	12,965	25,760	42,000
Gold:					
Mine output, Au content	23,739	46,133	70,000	73,300	82,400
Refined ^c	--	9,000	24,000	30,000	35,000
Iron and steel:					
Iron ore, gross weight	24,500	96,400	339,390	46,579	70,000
Metal, 58% Fe	14,200	55,900	196,800	27,000	40,600
Steel, semimanufactured ^c	400,000	400,000	400,000	400,000	400,000
Manganese, mine production	--	--	3,250	20,000 ^r	31,400
Silver: ^e					
Mine output, Ag content	700	700	800 ^r	900 ^r	1,000
Refined	--	200	800 ^r	900 ^r	1,000
Zinc, mine output, Zn content	--	--	--	46	--
INDUSTRIAL MINERALS					
Cement, hydraulic	3,002	3,511	3,538	3,373 ^r	3,708
Clay, kaolin	15,096	11,579	26,000	33,770	14,490
Feldspar	9,519	26,283	31,700	50,680	94,354
Fluorite	50	10,000	--	--	--
Gypsum	13,000	117,073	132,000	111,271	100,000
Marble	1,214	1,150	1,000	900	1,000
Mica	378	324	500	500 ^e	500 ^e
Quartz	--	5,292	--	--	--
Salt	10,791	26,315	20,800	37,295	23,434
MINERAL FUELS AND RELATED MATERIALS					
Petroleum:					
Crude, including condensate ³	106,216	37,737	43,070 ^r	43,800 ^r	38,325 ^r
Refinery products:					
Liquefied petroleum gas	3,617	3,217	3,357	3,729	3,462
Gasoline	9,811	9,381	8,582	12,259 ^r	13,077
Naphtha	177	75	156	139	147
Jet fuel	1,062	935	635	857	876
Kerosene	186	62	150	131	135
Distillate fuel oil	15,460	12,600	11,894	10,760	11,477
Residual fuel oil	1,830	663	1,698	1,954	1,954
Petroleum coke	1,571	1,477	1,408	1,299	1,575
Total	33,714	28,410	27,880	31,128	32,703

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through August 4, 2016.

²In addition to the commodities listed, other clay and (or) shale; construction aggregate and fill, copper, lime, limestone, sand and gravel, and stone were presumably produced, but available information was inadequate to make reliable estimates of output.

³For 2011, South Sudan's production was included only for the period before independence on July 9, and it was not included for the years 2012–15.

TABLE 2
SUDAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Cement	Atbara Cement Company Ltd. (Al-Rajhi Group, 100%)		Plant at Atbara	1,850,000
Do.	ASEC Cement Co. (Citadel Capital S.A.E., 100%)		Plant at Takamol	1,600,000
Do.	Berber Cement Co. Ltd.		Plant at Berber	1,580,000
Do.	Aslan Cement Co.		Plant at Khartoum	1,500,000
Do.	Nile Cement Co. Ltd.		Plant at Rabak	1,500,000
Do.	Al-Shamal Cement Factory (Mass Global Investment Co.)		Plant at Atbara	1,480,000
Do.	Al-Salam Cement Production Co. Ltd.		do.	660,000
Do.	Sudanese Cement Factory (Government, 100%)		Plant in Blue Nile State	100,000
Chromite	Ingessana Hills Mining Corp. [Sudanese Mining Corp., (Government, 100%)]		Mine at Ingessana Hills	70,000
Gold:				
Mine	kilograms	Artisanal miners	Jebel Amir mines in North Darfur State	40,000 ^e
Do.	do.	do.	Various locations	30,000 ^e
Do.	do.	Ariab Mining Co. Ltd. (AMC) (Government, 100%)	Mine at Hassai	2,000
Do.	do.	Alliance for Mining Co. Ltd.	Nile River State	1,700
Do.	do.	Delgo Minerals Co.	Northern State	NA
Do.	do.	Sahari Company for Gold Mining	Berber, River Nile State	NA
Do.	do.	Managem Group	Nite River State	503
Do.	do.	Tahe International Metal Mining Corp.	Mine at Abu Sara	NA
Refined	do.	Sudan Gold Refinery Co. (Government, 100%)	Refinery at Khartoum	270,000
Gypsum	Sudanese Mining Corp. (Government, 100%)		Bir Eit Mine in Red Sea State	15,000
Iron and steel:				
Crude steel	Sudan Master Technology		Plant at Giad Industrial City	60,000
Galvanized	Sudanese Steel Products Ltd.		do.	20,000
Rebar	Al-Assad Steel Bar Factory		Plant at Khartoum	394,000
Do.	Sudan Master Technology		Plant at Giad Industrial City	150,000
Do.	Sudanese Steel Products Ltd. (subsidiary of Hafez Elsayad Barbary Ltd.)		Plant at Khartoum	150,000
Do.	Sudanese Malaysian Factory		do.	100,000
Limestone	Al-Salam Cement Production Co. Ltd.		Mine in River Nile State	730,000 ^e
Do.	Al-Rajhi Group		Mine at Atbara	500,000
Do.	Nile Cement Company Ltd.		Mine at Rabak	200,000
Manganese	Ingessana Hills Mining Corp. [Sudanese Mining Corp. (Government, 100%)]		Mine at Barber in Red Sea State	75,000
Mica	Sheriek Mica Mines Co. [Sudanese Mining Corp. (Government, 100%)]		Mines at Sheriek ¹	1,800
Petroleum:				
Crude	thousand 42-gallon barrels	China National Petroleum Corp., 95%	Block 6 near Muglad	26,000 ^e
Do.	do.	Greater Nile Petroleum Operating Co. [China National Petroleum Corp. (CNPC), 40%; Petronas Carigali Overseas Shd. Bhd., 30%; ONGC Videsh Ltd., 25%; Sudan National Petroleum Corp. (Sudapet), 5%]	Blocks 1, 2, and 4 in West Kordofan State	22,000
Do.	do.	Star Oil Co. (Ansan Wikfs Investments Ltd., 66%, and Sudan National Petroleum Corp. (Sudapet), 34%).	Block 17 in South Kordofan State	2,200
Refined	do.	Khartoum Refinery Co. Ltd.[China National Petroleum Corp. (CNPC), 50%, and Sudan Petroleum Corp., 50%]	Refinery at Jali	36,500
Do.	do.	Port Sudan Refining Ltd. (Government, 100%)	Refinery at Port Sudan	7,920
Do.	do.	El-Obeid Refinery Co. (Government, 100%)	Refinery at El-Obeid	3,650
Do.	do.	Concorp Petroleum Ltd.	Refinery at Shajirah	3,650
Do.	do.	Abu Gabra Refinery Co. [Sudan National Petroleum Corp. (Sudapet) (Government, 100%)]	Refinery at Abu Gabra	730
Salt	Bittar Salt Company Ltd. (subsidiary of El-Nilein Holding Co.)		Mine at Port Sudan	100,000
Silver, refined	kilograms	Sudan Gold Refinery Co. (Government, 100%)	Refinery at Khartoum	146,000

^eEstimated. Do., do. Ditto. NA Not available.

¹Closed in 2013.