

# SUDAN

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In Sudan, rising production of gold and crude petroleum in recent years have increased substantially the mineral sector's influence on the national economy. Other mineral commodities produced included cement, chromite, gravel, gypsum, limestone, marble, mica, refined petroleum products, salt, and construction sand. Sudan was also known to have deposits of barite, copper, iron ore, kyanite, lead, nickel, silver, tungsten, wollastonite, and zinc.

In 2002, Sudan's gross domestic product (GDP) amounted to \$70.3 billion at purchasing power parity. The GDP increased by 5% in 2002 after rising by 5.3% in 2001, 6.9% in 2000, and 6.9% in 1999. In 2001, mining and quarrying accounted for about 9% of the GDP; manufacturing, 8%; construction, 5%; and electricity and water, nearly 2% (International Monetary Fund, 2003, p. 178; 2003a§,<sup>1</sup> b§; Bank of Sudan, undated e§).

The United Nations imposed sanctions on Sudan in 1996, and the United States, in November 1997. The sanctions, which were codified in 31 CFR part 538, prohibited investment by U.S. businesses in Sudan. In February 2000, the U.S. economic sanctions against Sudan were extended to Greater Nile Petroleum Operating Co. (GNPOC) and to Sudapet Ltd. of Sudan, but not to the international corporate owners of GNPOC (U.S. Department of the Treasury, 2000).

In 2002, the U.S. Congress passed the Sudan Peace Act, which would allow the President to block all loans from international organizations to Sudan if the Sudanese Government rejected peace negotiations with the Sudanese People's Liberation Army (SPLA) in southern Sudan. The Sudan Peace Act also authorized the U.S. Government to investigate future allegations of genocide against the Sudanese Government. The bill resulted from the possible role of oil revenues in financing the civil war between the Government of Sudan and the SPLA, as well as the allegations of atrocities and slavery associated with the war (Africa Energy Intelligence, 2002g).

## Commodity Review

### Metals

**Chromium.**—Ingessana Hills Mines Corp. (a state-owned company) operated three small-scale chromite mines in the Ingessana Hills. Mining was carried out by labor-intensive methods. Resources were estimated to be 2 million metric tons at a grade of 54% chrome oxide (Cr<sub>2</sub>O<sub>3</sub>) (Scott, 2002). The recent decline in output may be partially attributable to weakness in the market for stainless steel.

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

**Gold.**—Ariab Mining Company Ltd. (AMC) produced 6,000 kilograms (kg) of gold in 2002, which was an increase from 5,417 kg in 2001 and 5,773 kg in 2000. The company mined gold at the Baderuk, Hadal Auatib, and Oderuk deposits. AMC also held other gold concessions in Sudan. In 2002, the Government awarded block 9 to Shirian Al Shamal Company for Engineering and Mining, block 21 to Advanced Mining Works Co., and block 24 to Uni-group Holding (Pty.) Co. (Africa Mining Intelligence, 2002; Scott, 2002).

National gold exports rose to 8,660 kg in 2002 from 6,833 kg in 2001 and 8,452 kg in 2000. In addition to the gold produced and exported by AMC and Sudanese artisanal miners, some of Ethiopia's artisanal gold output was reported to be smuggled through Sudan (Addis Tribune, 2003§; Bank of Sudan, undated b§, c§).

**Iron and Steel.**—Sudan Master Technology operated a meltshop and rolling mill in Giad Industrial City. In 2001, Sudan's apparent consumption of finished steel amounted to 218,000 metric tons (t), which was an increase from 111,000 t in 2000 and 62,000 t in 1996. Imports of iron and steel increased to 380,639 t at a value of \$146.9 million in 2002 from 147,632 t at a value of \$99.1 million in 2001. Iron and steel imports accounted for 6% of Sudan's total imports (International Iron and Steel Institute, 2002, p. 91; Bank of Sudan, undated d§).

### Industrial Minerals

**Cement.**—Sudan's output of cement increased to 189,600 t in 2001 from 145,800 t in 2000. Atbara Cement Co. Ltd. increased its output to 139,300 t in 2001 from 105,500 t in 2000; and Nile Cement Co., to 50,300 t from 40,300 t. The combined output of the Atbara and Rabak cement plants in 2001 was about 35% of national cement production capacity (Bank of Sudan, undated a§).

**Gypsum.**—In 2001, Sudan produced 2,422 t of gypsum, which was a decrease from 13,808 t in 2000 and 11,144 t in 1999. Building Material Co. was the largest local producer, accounting for 720 t. In 2001, there were 18 valid leases for gypsum in Sudan (Geological Research Authority of the Sudan, undated, p. 14).

**Marble.**—Sudan's output of marble amounted to 15,500 square meters (m<sup>2</sup>) in 2001. Stones and Marbles Co. was the largest producer, accounting for 10,500 m<sup>2</sup>, followed by Al Masarra Co. with 3,000 m<sup>2</sup> and IMTCO Mining Co. with 2,000 m<sup>2</sup>. Small amounts of Sudanese marble were exported. In 2001, there were 477 valid quarrying leases in Sudan, which included aggregates, clay, gravel, marble, and sand and gravel (Geological Research Authority of the Sudan, undated, p. 14, 16).

**Salt.**—In 2001, Sudan had eight active salt-producing companies that produced 77,783 t of salt (table 1). The largest producer was Sudanese Salt Co., which accounted for 43,286 t, followed by Baaboud Salt Plant with 14,859 t and others with 19,638 t. In 2001, there were 29 valid leases for salt pans in Sudan (Geological Research Authority of the Sudan, undated, p. 14-15).

### **Mineral Fuels**

Sudan's proved recoverable reserves of crude petroleum were estimated to be 563 million barrels (Mbbbl); reserves of natural gas amounted to 85 billion cubic meters. Crude petroleum production increased to 87.76 Mbbbl in 2002 from 77.76 Mbbbl in 2001 and 17.12 Mbbbl in 1999 (table 1). GNPOC [a joint venture of China National Petroleum Corp. (CNPC), Petronas Carigali Overseas Shd. Bhd. of Malaysia, Talisman Energy Inc. of Canada, and Sudan Petrol Co. (Sudapet)] produced most of Sudan's crude petroleum from the el-Toor, Grand Heglig, Tooma South, and Unity oilfields in blocks 1A and 2A. In 2002, the Government announced plans to increase Sudan's crude petroleum production to 270,000 barrels per day (bbl/d) in 2003, or nearly 99 Mbbbl (Radler, 2001; Africa Energy Intelligence, 2003c).

In 2002, Talisman explored for petroleum in block 4 in the Muglad Basin. In October, Talisman announced plans to sell its share of GNPOC to ONGC Videsh of India; the sale was supposed to be finalized in December. At the end of the year, the deal was held up by efforts of CNPC and Petronas to exercise their options to buy Talisman's share. ONGC Videsh and Talisman were appealing to the Government of Sudan to allow the sale to go forward (Oil & Gas Journal, 2002; Africa Energy Intelligence, 2003b).

Blocks 5A and 5B in the Muglad Basin were held by a consortium consisting of Petronas Carigali Overseas of Malaysia (41%), Lundin Petroleum AB of Sweden (24.5%), OMV Aktiengesellschaft of Austria (24.5%), and Sudapet (10%). The facilities in block 5A was attacked by the SPLA in early 2002; as of October, Lundin had not resumed operations (Africa Energy Intelligence, 2002f; Oil & Gas Journal, 2002).

In January 2002, Slavneft Oil and Gas Joint Stock Company of Russia signed a production-sharing agreement with the Government for block 9. In the second half of 2002, however, the new management at Slavneft decided to abandon the company's interests in Sudan because of political risk (Africa Energy Intelligence, 2002e; Oil & Gas Journal, 2002).

Blocks 3 and 7 in eastern Sudan were held by Sudapet, CNPC, and Gulf Petroleum; block 6 to the northeast of Muglad, by CNPC; and blocks B and C to the southeast of Muglad, by TotalFinaElf, Marathon Oil Corp., and Kuwait Foreign Petroleum Exploration Co. In mid-2002, Petrel Resources plc of Ireland submitted an application to explore for petroleum in blocks 13 and 15 in the Red Sea. Other companies negotiating with the Government in 2002 included RomPetrol Group of Romania for block 8 in eastern Sudan; Japan National Oil Corp. and Impex of Japan for block 12 in northwestern Sudan; and Sonatrach of Algeria, for block 15 (Africa Energy Intelligence, 2002d, f; Oil & Gas Journal, 2002).

In 2002, exports of crude petroleum increased to 62.2 Mbbbl at a value of nearly \$1.4 billion from 56.16 Mbbbl at a value of \$1.27 billion in 2001. Crude petroleum accounted for 72% of the value of Sudan's exports in 2002 and nearly 75% in 2001. In the first half of 2002, Sudan exported 25 Mbbbl to China. Sudan was a leading supplier of petroleum to Kenya (Africa Energy Intelligence, 2003a; Bank of Sudan, undated d\$).

The Khartoum Oil Refinery was Sudan's largest producer of petroleum products. Gasoline from the refinery was sent to Port Sudan for export. Other facilities were the Port Sudan Oil Refinery and the topping plants at Abu Jabra, El Obeid, and Sharjirah; the topping plants produced mainly heavy fuel oil. In the fourth quarter of 2002, the Government issued a tender to restore the refinery at Port Sudan and raise its capacity to 100,000 bbl/d from 25,000 bbl/d. The Government also announced plans to increase capacity at Khartoum to 90,000 bbl/d from 50,000 bbl/d, and at the El Obeid topping plant, to 15,000 bbl/d from 10,000 bbl/d (Arab Petroleum Research Center, 2002; Africa Energy Intelligence, 2002c, 2003c).

In 2002, the value of petroleum products exports amounted to \$114.4 million, which was an increase from \$107.4 million in 2001. Exports of gasoline were \$93.1 million; liquefied petroleum gas, \$17.4 million; naphtha, \$2.76 million; and others, \$1.14 million. Exports of petroleum products accounted for nearly 6% of Sudan's total exports in 2002 (Bank of Sudan, undated d\$).

Sudan was a net importer of petroleum products in 2002; imports increased to 477,052 t at a value of \$132.3 million from 354,694 t at a value of \$98.1 million in 2001. Imports of petroleum products accounted for about 5% of Sudan's total imports (Bank of Sudan, undated e\$).

### **Infrastructure**

At the end of 2001, Sudan's electrical generating capacity was 2,600 megawatts (MW). The National Electricity Corporation planned to increase capacity with the construction of the Merowe Dam, which would have a capacity of 1,250 MW. Construction on the Merowe Dam was expected to start in 2003 (Africa Energy Intelligence, 2002a, b).

In 2002, the capacity of the oil pipeline that ran from block 1A to Port Sudan had a capacity of 240,000 bbl/d. GNPOC planned to increase the pipeline's capacity to 300,000 bbl/d by the third quarter of 2003 (Oil & Gas Journal, 2002).

### **Outlook**

The International Monetary Fund (2003, p. 178) predicted that Sudan's GDP would rise by 5.8% in 2003 and 6.2% in 2004. High rates of GDP growth may lead to increased demand for such local construction materials as cement, gravel, limestone, marble, and sand. The outlook for Sudan's petroleum and gold industries depends heavily upon world market conditions; most of the production of these commodities is exported.

Plans to increase production of crude oil to 270,000 bbl/d in 2003 could be disrupted by the civil war between the Government and the SPLA or the 40 local tribal subconflicts that plague the country (Peel, 2002). The outlook for exploration

and investment in undeveloped resources of barite, copper, iron ore, kyanite, lead, nickel, silver, tungsten, wollastonite, and zinc was for little change in the near future until the civil unrest and political risk climate improves.

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TABLE 1  
SUDAN: PRODUCTION OF MINERAL COMMODITIES <sup>1,2</sup>

Commodity		1998	1999	2000	2001	2002 <sup>e</sup>
Cement, hydraulic	metric tons	197,800	230,600	145,800	189,500 <sup>r</sup>	190,000
Chromite, mine output, gross weight <sup>3</sup>	do.	30,500	48,000	28,500	20,500	14,000 <sup>4</sup>
Gold, mine output, Au content <sup>5</sup>	kilograms	5,671 <sup>r</sup>	5,566 <sup>r</sup>	5,774 <sup>r</sup>	5,417 <sup>r</sup>	6,000 <sup>4</sup>
Gypsum	metric tons	3,000 <sup>e</sup>	11,144 <sup>r</sup>	13,808 <sup>r</sup>	2,422 <sup>r</sup>	2,400
Petroleum:						
Crude, including lease condensate	thousand 42-gallon barrels	1,200 <sup>e</sup>	17,120	67,152	77,755	87,759 <sup>4</sup>
Refinery products:						
Liquefied petroleum gas	do.	--	--	1,656	2,493	2,500
Gasoline	do.	71	124	6,456	8,203	8,200
Naptha	do.	--	--	--	223	220
Jet fuel	do.	--	--	--	910	910
Kerosene	do.	263	334	250	229	230
Residual fuel oil	do.	892	1,047	4,160	1,603	1,600
Other	do.	--	--	--	1,940 <sup>e</sup>	1,940
Total	do.	1,226 <sup>r</sup>	1,505 <sup>r</sup>	12,522 <sup>r</sup>	15,600 <sup>r,e</sup>	15,600
Salt	metric tons	72,211	117,148	120,000 <sup>e</sup>	77,783 <sup>r</sup>	78,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Includes data available through July 7, 2003.

<sup>2</sup>In addition to the commodities listed, the following are presumably produced although available information is inadequate to estimate output: clay and/or shale for cement manufacture (normally about 0.4 metric ton of clay and/or shale per metric ton of finished cement); limestone for cement manufacture (normally at least 1.25 metric tons per metric ton of finished cement), agriculture, lime manufacture, and construction aggregate and fill; and other construction materials (clays, sand and gravel, stone, and others for local use, and marble for export).

<sup>3</sup>Presumed to be ores and concentrates with an estimated average grade of about 54% chromic oxide.

<sup>4</sup>Reported figure.

<sup>5</sup>Does not include artisanal output.

TABLE 2  
SUDAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2002

(Metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity
Cement		Atbara Cement Company Ltd. (LaFarge Group of France and Dal Group of Sudan)	Atbara	360,000.
Do.		Nile Cement Company (Government, 100%)	Rabak	150,000.
Chromite		Ingessana Hills Mines Corp.	Ingessana Hills	48,000.
Gold	kilograms	Compagnie Miniere Or (Government of Sudan, 60%; Ariab Mining Company, 40%)	Ariab	6,100.
Gypsum		Sudanese Mining Corp. (Government, 100%)	Bir Eit Mine	15,000.
Limestone		Atbara Cement Company Ltd.	Atbara	500,000.
Do.		Nile Cement Company	Rabak	200,000.
Marble		Pentco Engineering & Trading Company	Port Sudan and Gedaref	100,000.
Mica		Sudanese Mining Corp. (Government, 100%)	Sheriek Mines	1,800.
Petroleum:				
Crude	thousand barrels	Greater Nile Petroleum Operating Co. [China National Petroleum Corp. (CNPC), 40%; Petronas, 30%; Talisman Energy, 25%; National Petroleum Co. of Sudan (Sudapet), 5%]	Block 1, Unity, El Toor, and Tooma South Fields; block 1a, Munga and Khairat Fields; block 2, Grand Heglig Field (Heglig, Barki, Hamra, Kanga Laloba, Rihan, and Toma Fields); and block 2a, Bamboo and Garaad Fields	80,300.
Do.	do.	Gulf Petroleum (Sudan) Ltd. (Qatar Petroleum Co., 60%; Concorp Intl. of Sweden, 20%; Sudapet, 20%)	Block 3—Adar-Yale Field	1,825.
Do.	do.	CNPC	Block 6—Abu Gabra, Sharaf, and Tabaldi Fields	730.
Refined	thousand barrels	Khartoum Oil Refinery	Jali	1,515 liquefied petroleum gas; 7,428 gasoline; 1,569 kerosene; 7,738 diesel fuel.
Do.	do.	Port Sudan Refining Ltd. (Government, 100%)	Port Sudan	92 liquefied petroleum gas; 1,14 gasoline; 989 kerosene; 2499 diesel fuel; 4,154 residual fuel oil; 458 naptha.
Do.	do.	Government	El Obeid	3,650.
Do.	do.	Concorp Ltd.	Shajirah	3,650.
Do.	do.	Government	Abu Jabra	730.
Steel:				
Crude		Sudan Master Technology	Giad Industrial City	60,000.
Rebar		do.	do.	150,000.