



2019 Minerals Yearbook

TANZANIA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF TANZANIA

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In 2019, Tanzania played a significant role in the global production of gold, accounting for about 1% of the world's gold mine output. The country was also the world's only producer of tanzanite, which is a gemstone variety of zoisite that gets its color from trace amounts of vanadium. Other domestically significant mining and mineral-processing operations included cement and natural gas. Tanzania was not a globally significant consumer of minerals or mineral fuels in 2019 (National Bureau of Statistics, 2020, p. 63; Sheaffer, 2021).

Minerals in the National Economy

In 2019, the manufacturing sector accounted for 8.5% of the gross domestic product (GDP), and mining and quarrying, 5.2%. The value of output in the mining sector increased by 17.7% in 2019 compared with 1.5% in 2018, which could be attributable to increased gold production. Large-scale mines employed about 12,000 workers in 2017 (the latest year for which data were available); as many as 1.5 million artisanal miners were estimated to produce bauxite, building materials, colored gemstones, copper, diamond, gold, tin, and other mineral commodities (Zavala, 2017; Bank of Tanzania, 2020a, p. 27, 31).

In 2019, Tanzania's total exports were valued at \$5.57 billion, of which gold accounted for 39.8%. Total imports were valued at \$9.02 billion in 2019, of which petroleum products and fertilizers accounted for 24.7% and 1.6%, respectively (Bank of Tanzania, 2020b, p. 10–11).

Tanzania is a signatory to the Kimberley Process Certification Scheme, which is a certification system established to reduce the trade in conflict diamond. Upstream natural gas and petroleum exploration and production are governed by the Petroleum Act 2015 and the Petroleum (Local Content) Regulations 2017.

In July 2017, the Government passed the Natural Wealth and Resources (Permanent Sovereignty) Act 2017, the Natural Wealth and Resources Contracts (Review and Re-negotiation of Unconscionable Terms) Act 2017, and the Written Laws (Miscellaneous Amendments) Act 2017. The new laws mandate Government ownership of at least 16% in mining projects and allow the Government to renegotiate or terminate contracts with mining companies. The new laws also increase royalties on copper, gold, platinum, and silver exports to 6% from 4% and royalties on colored gemstone, diamond, and uranium exports to 6% from 5% (Solomons, 2017; Daghar, 2019).

In January 2018, the Government passed new regulations mandating that Tanzanian companies have at least 5% equity in mining operations in addition to the Government's free-carried interest. The regulations also mandate that priority be given to Tanzanian companies when mining licenses are issued (Ng'wanakilala, 2018).

In March 2019, the Government established a total of 28 mineral-trading centers in various mineral-producing localities in Tanzania to formalize artisanal and small-scale mining and to reduce smuggling of gold and other minerals.

The Government required a mineral dealers' license to sell minerals at the trading centers. The Government also canceled about 1,000 inactive mining licenses and announced plans to redistribute them to small-scale miners (Reid, Lewis, and Herman, 2019).

In 2019, the Government lifted the ban on the export of mineral concentrates, which it had established in June 2017 to encourage downstream processing. The Government also replaced mining taxes that included an 18% value-added tax on mineral sales, a 7.3% inspection fee, a 5% withholding tax, and a 0.3% government service fee with a 7% royalty on mineral sales (Thomson Reuters, 2019; Kahn, 2020).

In October 2017, the former Ministry of Energy and Minerals was divided into the Ministry of Energy and the Ministry of Minerals. The Ministry of Energy was responsible for regulating natural gas and petroleum exploration and production. The Mining Commission, which was part of the Ministry of Minerals, was responsible for mine inspections, licensing and mineral rights, and the regulation and promotion of artisanal and small-scale mining (Lewis, 2017).

Production

In 2019, the production of pumice increased by 187%; salt, by 173%; limestone, by 88%; sand, by 45%; cement, by 44%; tin, by an estimated 25%; gold, by 23%; and coal, by 13%. Refined aluminum and lead production started in 2019, but information was not available to make a reliable estimate of output. Between 2015 and 2019, kaolin production increased by 686%; coal, by 178%; cement, by 108%; diamond, by 93%; and natural gas, by 70%. Kaolin output decreased by 88% in 2019. Bauxite mining shut down in 2018. Between 2015 and 2019, tin production decreased by an estimated 94%; emerald, by an estimated 87%; lime, by an estimated 70%; amethyst, by an estimated 66%; sapphire, by an estimated 64%; aquamarine, by an estimated 63%; and sunstone, by an estimated 53% (National Bureau of Statistics, 2020, p. 63).

Coal production increased in 2019 because of recent mine openings and increases in capacity. The increase in reported gold production was at least partially attributable to the establishment of mineral trading centers by the Government in March. Data on mineral production are in table 1.

Structure of the Mineral Industry

Most of Tanzania's gold mines were privately owned; the cement plants, natural gas operations, the Minjingu phosphate mine, and the Nyanza salt mines were also owned by private investors. The Government-owned State Mining Corp. (STAMICO) operated the Biharamulo gold mine. The Government also held a 50% share in the large-scale tanzanite mining operations at Block C at Merelani and minority interests in the privately owned Ngaka coal mine and the Williamson

diamond mine. The new mining laws passed in 2017 mandated at least 16% Government ownership in mining projects (Solomons, 2017).

Artisanal and small-scale miners accounted for most of the country's colored gemstone production; copper, crushed stone, diamond, and gold were also produced by artisanal and small-scale miners. Capacity, location, ownership, and production information were not readily available for many of these operations. Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Aluminum and Lead.—In April 2019, Gravita Tanzania Ltd. (a subsidiary of Gravita India Ltd. of India) announced that commercial-scale production had started at its lead refinery near Dar es Salaam with a capacity of 3,000 metric tons per year (t/yr). The plant also had a capacity of 6,000 t/yr of refined aluminum; production of cast aluminum alloys started in July. Aluminum and lead were produced by remelting scrap (Business Standard, 2019; Gravita India Ltd., 2019).

Gold and Silver.—In 2019, Barrick Gold Corp. of Canada produced about 10,400 kilograms (kg) of gold at the North Mara Mine, which was nearly unchanged from 2018. At the Buzwagi Mine, output decreased to about 3,600 kg in 2019 from 4,500 kg in 2018, and at the Bulyanhulu Mine, to nearly 1,200 kg in 2019 from nearly 1,300 kg in 2018. Bulyanhulu's underground mining operations were shut down; the mine produced gold by re-treating tailings. Barrick purchased all outstanding shares in its Tanzanian operations in 2019 (Acacia Mining plc, 2019, p. 13, 39, 41, 43; Barrick Gold Corp., 2020, p. 19, 32, 59).

Planned production at North Mara was between 8,900 and 10,000 kg of gold in 2020. Barrick planned to maintain production at about 8,500 kilograms per year (kg/yr) between 2022 and 2024. The company planned to produce between 1,100 and 1,900 kg at Bulyanhulu in 2020. Barrick planned to reopen the underground mining operations at Bulyanhulu and increase production to about 8,100 kg in 2022 and 9,000 kg in 2024. Buzwagi was expected to produce between 3,000 and 3,700 kg in 2020 and to be placed on care-and-maintenance status in 2021 (Barrick Gold Corp., 2020, p. 19, 33, 59).

Geita Gold Mining Ltd. (a subsidiary of AngloGold Ashanti Ltd. of South Africa) produced about 18,800 kg of gold at the Geita Mine in 2019 compared with 17,500 kg in 2018. Higher production was attributable to increased ore grades (AngloGold Ashanti Ltd., 2020, p. 85).

Shanta Gold Ltd. of the United Kingdom produced 2,628 kg of gold and 2,816 kg of silver at the New Luika open pit mine in 2019; production was 2,547 kg of gold and 3,323 kg of silver in 2018. Planned production at New Luika, which is located in Mbeya Region, was between 2,500 and 2,600 kg of gold in 2020. In 2019, exploration by Shanta extended the life of the New Luika Mine until 2024 (Shanta Gold Ltd., 2020, p. 5, 10).

Shanta was considering options for financing its Singida project in the Singida Region. The company planned to start construction at Singida in 2020. Total planned production at New Luika and Singida was about 3,100 kg/yr (Shanta Gold Ltd., 2020, p. 5, 7).

Sales of gold from small-scale mines increased to 4,660 kg in 2019 from 337 kg in 2016. Increased sales were attributable to the establishment of mineral trading centers by the Government (Reid, Lewis, and Herman, 2019; Masare, 2020).

In late April 2017, Tanzanian Gold Corp. of Canada (formerly Tanzanian Royalty Exploration Corp.) and its joint-venture partner Stamico completed a feasibility study on a large-scale mine at the Buckreef project. Planned production in the study was nearly 1,700 kg/yr of gold during an estimated 17-year mine life. Reserves were estimated to be about 33,000 kg of contained gold. The company planned to start mining of high-grade ore near the surface in 2020 and to conduct conceptual and feasibility studies on full production at the mine (Tanzanian Royalty Exploration Corp., 2017, 2019).

OreCorp Ltd. of Australia completed a scoping study on a new mine at the Nyanzaga project in August 2016 and a prefeasibility study in March 2017. Planned production in the study was about 6,600 kg/yr during an estimated 13-year life of the mine. Resources for the project were estimated to be 29.8 million metric tons (Mt) at a grade of 3.48 grams per metric ton gold. Depending on the results of a feasibility study, OreCorp had planned to start construction in 2018. As of the end of 2019, the feasibility study had not started (Cornish, 2017b).

Katoro Gold plc of the United Kingdom (Kibo Mining plc of Ireland, 56.7%) was considering the development of a new mine at its Imweru project that could produce nearly 1,600 kg/yr of gold. Contained resources at Imweru were estimated to be 16,000 kg of gold. In August 2019, Katoro Gold reached an agreement to sell Imweru to Lake Victoria Gold Ltd. of Australia (Katoro Gold plc, 2017, 2019).

Titanium and Zirconium.—In the fourth quarter of 2018, Strandline Resources Ltd. of Australia completed an updated feasibility study on a new mine at the Fungoni mineral sands deposit near Dar es Salaam. Planned production in the study was about 32,000 t/yr of ilmenite, 13,500 t/yr of zircon, 2,500 t/yr of rutile, and 500 t/yr of leucoxene during a mine life of slightly more than 6 years. Mining was expected to start in 2021. Strandline estimated that reserves at Fungoni were 12.3 Mt at grades of 1.92% ilmenite, 0.81% zircon, 0.15% rutile, and 0.03% leucoxene (Strandline Resources Ltd., 2018; 2019, p. 8).

Industrial Minerals

Cement.—Tanzania's cement production increased to 6.51 Mt in 2019 from a revised 4.51 Mt in 2018 and 2.81 Mt in 2014 because of the opening of new plants and the expansion of existing plants. As of yearend, the country had seven cement producers with a total capacity of 10.3 million metric tons per year (Mt/yr) (table 2; National Bureau of Statistics, 2020, p. 64).

Lake Cement Ltd. of India operated a cement plant with a capacity of 500,000 t/yr at Kimbiji. The company planned to complete a new plant with a capacity of 1.4 Mt/yr at Bagamoyo by 2019. In 2018, Kisarawe Cement Ltd. was engaged in the expansion of its plant's capacity to 162,000 t/yr from 108,000 t/yr; the company also planned a subsequent increase to 450,000 t/yr. As of the end of 2019, it was unclear whether Kisarawe's and Lake's projects were completed (Global Cement, 2016; International Cement Review, 2018a, b).

Diamond.—Petra Diamonds Ltd. of the United Kingdom operated the open pit Williamson Mine, which accounted for most of the diamond produced in Tanzania. The company produced 407,545 carats of diamond from open pit and alluvial operations in 2019 compared with 380,689 carats in 2018. The estimated remaining life of the mine was 12 years (Petra Diamonds Ltd., 2019, p. 15; 2020, p. 16, 49).

Gemstones.—Tanzania produced a variety of gemstones that included alexandrite, amethyst, aquamarine, cordierite, emerald, garnet, quartz, ruby, sapphire, spinel, sunstone, tanzanite, and tourmaline. Merelani, which is located near Arusha, was the world's only source of tanzanite. Artisanal and small-scale miners operated in Blocks B and D of the Merelani deposit. TanzaniteOne Mining Ltd. (Sky Associates Group Ltd., 50%, and STAMICO, 50%) mined tanzanite in Block C. Mining was expected to continue at Block C until 2042 (Mzamo, 2018).

Graphite.—In July 2019, Black Rock Mining Ltd. of Australia updated its feasibility study on a new graphite mine at the Mahenge project in Morogoro Region. Depending on the negotiation of a fiscal agreement with the Government in the first half of 2020, Black Rock could start mining in 2020 or 2021. The company planned to produce 83,000 t/yr of concentrate at a grade of 99% graphite in the first stage of mining. Black Rock planned to start the second stage in 2021 or 2022; the third stage, in 2022 or 2023; and the fourth stage, in 2023 or 2024. Full production would be 350,000 t/yr. The estimated life of the mine was 26 years (Black Rock Mining Ltd., 2019; Cornish, 2019).

Volt Resources Ltd. of Australia completed a feasibility study on the first stage of a new graphite mine at its Bunyu project in late July 2018. The company planned to start production at the rate of 23,700 t/yr of graphite concentrate in the third quarter of 2020. Volt also planned to start a feasibility study on the second stage of mining by early 2020. Depending on the results of the study, production could increase to 170,000 t/yr starting in late 2022. The estimated life of the Bunyu Mine, which is located in southeastern Tanzania, was at least 22 years (Kalkine Media, 2019).

Walkabout Resources Ltd. of Australia completed a feasibility study on a new graphite mine at its Lindi Jumbo project, which is located to the west of Mtwara, in March 2019. Planned production in the study was 40,000 t/yr of concentrate at a grade of 95% graphite, of which jumbo-flake (flakes larger than 300 microns) would account for 49%, and large-flake (flakes between 180 and 300 microns), 25%. Walkabout planned to start mining at Lindi Jumbo in 2021; the estimated life of the mine was 24 years (Walkabout Resources Ltd., 2019, p. 17, 30, 38).

In September 2018, Graphex Mining Ltd. of Australia completed an updated prefeasibility study on the Chilalo graphite project in Lindi Region. Planned production in the study was 58,000 t/yr of concentrate at a grade of 93% graphite in the first 2 years of mining and 108,000 t/yr subsequently. Jumbo-flake graphite was likely to account for 57% of production, and large-flake, 9%. The estimated life of the mine was between 6 and 7 years. Graphex planned to complete a feasibility study in the second quarter of 2019; mining could start in the second quarter of 2020, depending on the results. As of the end of 2019, the

completion of the feasibility study was delayed until January 2020 (Graphex Mining Ltd., 2018, p. 1, 15, 19; 2019).

Armada Capital completed a scoping study on a new graphite mine at Mahenge Liandu in March 2018. Planned production in the study was 50,000 t/yr of concentrate at a grade of 98% graphite during an estimated 32-year mine life. Jumbo-flake graphite was likely to account for 24.5% of production, and large-flake, 23.6%. The company initiated a feasibility study in May 2018. As of December 2019, Armada planned to complete the study in the first quarter of 2020. Depending on the results of the study, mining could start in the first half of 2021 (Armada Capital plc, 2018a, b; 2019).

In April 2016, Magnis Resources Ltd. of Australia completed a feasibility study on a new mine at the Nachu project. The production target was 220,000 t/yr of concentrate at a grade of between 97% and 99% graphite during the estimated 15-year mine life; production was planned to be 240,000 t/yr during the first 12 years. Reserves were estimated to be 76 Mt at a grade of 4.8% graphite. Magnis expected to sell about 140,000 t/yr of graphite to the spherical graphite and lithium battery markets, 77,000 t/yr to the jumbo-flake and expandable graphite markets, and 22,000 t/yr to the super-jumbo-flake and aerospace markets. As of the end of 2019, it was unclear when production would start (Washbourne, 2016; Magnis Resources Ltd., 2018, p. 33, 37).

Kibaran Resources Ltd. of Australia was engaged in the development of a new graphite mine at the Epanko project. In mid-2017, the company completed a feasibility study on expanding its planned production to 60,000 t/yr of graphite concentrate from 40,000 t/yr. Concentrate from Epanko was expected to have a grade of between 96% and 97% graphite. Estimated capital costs for an 18-year mine life were nearly \$89 million. Depending on financing, Kibaran planned to start production by the end of 2018 and to reach full capacity in 2019. As of the end of 2019, it was unclear when production would start (Cornish, 2017a).

Rare Earths.—In April 2017, Peak Resources completed a feasibility study on a new rare earths mine at its Ngualla project; the study was updated in August. Planned production was 14,700 t/yr of rare-earth oxides from bastnaesite during an estimated 26-year mine life. Rare-earth concentrates from Ngualla would be processed at a refinery in the United Kingdom. Resources were estimated to be 214 Mt at a grade of 2.15% rare-earth oxides, and reserves, 18.5 Mt at a grade of 4.8% rare-earth oxides. As of the end of 2019, it was unclear when production would start (Peak Resources Ltd., 2017, p. 1, 7, 12, 15, 28).

In Strandline's feasibility study on the Funconi mineral sands project, planned monazite production was about 1,500 t/yr. Reserves were estimated to be 12.3 Mt at a grade of 0.09% monazite. Depending on obtaining financing, production could start by 2021 (Strandline Resources Ltd., 2018; 2019, p. 8).

Mineral Fuels and Related Materials

Coal.—Tanzania's coal production increased in 2019 to 712,136 metric tons (t) from a revised 627,652 t in 2018. Intra Energy Corporation Ltd. of Australia and its joint-venture partner National Development Corp. (owned by the Government) operated a mine at the Ngaka coalfield in

Ruvumu District that accounted for most of the country's coal production. The cement industry accounted for 56% of the mine's sales; the ceramic industry, 32%; and the textile industry and other industries, 12%. In 2017, the mine's capacity increased to 960,000 t/yr from 480,000 t/yr (Intra Energy Corporation Ltd., 2017, p. 5; 2019, p. 4; National Bureau of Statistics, 2020, p. 63).

Edenville Energy plc of the United Kingdom operated the Rukwa Mine near Sumbawanga. The company planned to increase its production to 120,000 t/yr by May 2020 (Edenville Energy plc, 2019).

In January 2017, Kibo Energy plc (formerly Kibo Mining plc) of Ireland completed a feasibility study on a new mine and coal-fired power station at the Mbeya Coal to Power project in southwestern Tanzania. The initial planned capacity of the power station was between 250 and 300 megawatts (MW); Kibo could expand the capacity subsequently to 600 MW. The initial planned coal consumption was about 1.5 Mt/yr. Kibo estimated that the life of the mine was 30 years. In April 2019, the Government-owned Tanzania Electric Supply Company Ltd. advised Kibo that Mbeya could be developed for export markets. At yearend, it was unclear when development would start (Kibo Mining plc, 2017; Kibo Energy plc, 2020, p. 6).

Helium.—Helium One Ltd. of the United Kingdom explored for helium in southwestern Tanzania. In June 2016, the company announced an initial resource estimate of 1.5 billion cubic meters of helium under Lake Rukwa. In 2017, Helium One revised its resource estimate to 2.8 billion cubic meters. Helium One planned to produce 10 million cubic meters per year at Lake Rukwa; production could increase to nearly 60 million cubic meters per year. As of mid-2019, production was planned to start in 2021 (Moore, 2016; Helium One Ltd., 2017; Collins, 2019).

Natural Gas.—In 2019, Orca Exploration Group Inc. of the United Kingdom produced nearly 1.07 billion cubic meters of natural gas from Songo Songo Island compared with 809 million cubic meters in 2018. Gas-fired power stations and cement plants were the leading consumers of natural gas from Songo Songo. At yearend, the total capacity of the gasfields on and near Songo Songo Island was 1.77 billion cubic meters per year (Orca Exploration Group Inc., 2019, p. 5; 2020, p. 23, 37).

Etablissements Maurel et Prom SA of France and its joint-venture partners operated the Mnazi Bay offshore natural gas project in the Rovuma Basin. In 2019, the companies produced 727 million cubic meters compared with 860 million cubic meters in 2018. Production was likely to increase after the commissioning of the Kinyerezi-1 extension gas-fired power station in late 2020 (Wentworth Resources plc, 2020, p. 8, 13).

Royal Dutch Shell plc of the Netherlands, Equinor ASA (formerly Statoil ASA) of Norway, and their joint-venture partners were considering the development of a liquefied natural gas (LNG) plant near Mtwara that would use natural gas from offshore Blocks 1, 2, and 4. The plant would have a capacity of 10 Mt/yr of LNG, which was equivalent to 13.8 billion cubic meters per year of natural gas. The companies planned to start construction in 2022 and production in 2028, depending on negotiations with the Government. As of the end of 2019, negotiations were on hold (Musarra, 2014; Ng'wanakilala and Dausen, 2019; Lewis, 2020).

Outlook

Tanzania's production of coal, gold, and natural gas are expected to increase in the near future. Ilmenite, rare earths, rutile, and zircon production could start in 2021. Coal production is expected to increase modestly in 2020; more substantial increases in production would depend on the development of the Mbeya project. The outlook for natural gas production is for it to increase from 2020 through 2022. Increased gold production at the Bulyanhulu Mine and the opening of the Singida Mine are expected to more than offset decreased production at the North Mara Mine and from the closure of the Buzwagi Mine. Further increases in gold production could result from the development of the Buckreef and the Nyanzaga Mines.

New Tanzanian mines could potentially have substantial effects upon world markets for graphite and helium. Graphite production could restart in 2020; total planned production was about 700,000 t/yr by 2025. World graphite production was estimated to be about 1.1 Mt in 2019. Helium production could potentially start in 2021; initial planned output was 10 million cubic meters per year. World helium production was estimated to be about 160 million cubic meters in 2019 (Olson, 2021; Peterson, 2021).

References Cited

- Acacia Mining plc, 2019, Annual report & accounts 2018: Acacia Mining plc, 187 p. (Accessed October 29, 2019, at http://www.annualreports.com/HostedData/AnnualReports/PDF/LSE_ACA_2018.pdf.)
- AngloGold Ashanti Ltd., 2020, Integrated report 2019: AngloGold Ashanti Ltd., 159 p. (Accessed August 4, 2020, at <https://www.anglogoldashanti.com/investors/annual-reports/>.)
- Armada Capital Plc, 2018a, Commencement of feasibility study at Mahenge Liandu: Armada Capital Plc, May 3. (Accessed December 6, 2019, at <http://armadalecapitalplc.com/news>.)
- Armada Capital Plc, 2018b, Mahenge Liandu pit optimisation and 31 year mine plan completed for Mahenge Liandu graphite project: Armada Capital Plc, March 19. (Accessed December 6, 2019, at <http://armadalecapitalplc.com/news>.)
- Armada Capital Plc, 2019, Corporate update: Armada Capital Plc, December 18. (Accessed September 10, 2020, at <http://armadalecapitalplc.com/news>.)
- Bank of Tanzania, 2020a, Economic bulletin for the quarter ending June 2020: Bank of Tanzania, 88 p. (Accessed September 14, 2020, at <https://www.bot.go.tz/Publications/Filter/2>.)
- Bank of Tanzania, 2020b, Monthly economic review: Bank of Tanzania, January, 26 p. (Accessed September 14, 2020, at <https://www.bot.go.tz/Publications/Filter/1>.)
- Barrick Gold Corp., 2020, Annual report 2019: Barrick Gold Corp., 220 p. (Accessed October 1, 2020, at <https://www.barrick.com/English/investors/annual-report/default.aspx>.)
- Black Rock Mining Ltd., 2019, Black Rock Mining and the Mahenge project: Black Rock Mining Ltd., October 17–18, [unpaginated]. (Accessed October 1, 2019 at <https://blackrockmining.com.au/investor-centre/#presentations>.)
- Business Standard, 2019, Gravita's step down subsidiary starts production of aluminum cast alloys in Tanzania: Business Standard [New Delhi, India], July 11. (Accessed October 2, 2020, at https://www.business-standard.com/article/news-cm/gravita-s-step-down-subsidiary-starts-production-of-aluminum-cast-alloys-in-tanzania-119071101100_1.html.)
- Collins, Tom, 2019, Tanzania could become top helium producer: African Business, May 9. (Accessed September 22, 2020, at <https://africanbusinessmagazine.com/sectors/energy/tanzania-could-become-top-helium-producer/>.)
- Cornish, Laura, 2017a, Kibaran Resources unlocking Epanko's true graphite potential: Mining Review Africa, no. 7, July, p. 28–31.

- Cornish, Laura, 2017b, OreCorp's Nyanzaga gold project climbing quickly up the value chain: Mining Review Africa, no. 5, May, p. 28–30.
- Cornish, Laura, 2019, Black Rock Mining's Mahenge—No need for window dressing: Mining Review Africa, no. 10, October, p. 34–36. (Accessed October 1, 2020, at <http://spintelligentpublishing.com/Digital/Mining-Review-Africa/2019Issue10/>.)
- Daghar, Mohamed, 2019, Efforts to curb tanzanite smuggling make Tanzania shine: ENACT, July 25. (Accessed September 30, 2020, at <https://enactafrica.org/research/trend-reports/efforts-to-curb-tanzanite-smuggling-make-tanzania-shine>.)
- Edenville Energy plc, 2019, Investor presentation—May 2019: Edenville Energy plc, May, 13 p. (Accessed September 30, 2020, at <https://edenville-energy.com/pdfs/Edenville-May2019-Investor-Presentation-FINAL.pdf>.)
- Global Cement, 2016, Lake Cement to build 1.4Mt/yr plant in Tanzania: Global Cement, November 28. (Accessed February 23, 2018, at <http://www.globalcement.com/news/item/5537-lake-cement-to-build-1-4mt-yr-plant-in-tanzania>.)
- Graphex Mining Ltd., 2018, Update pre-feasibility study confirms exceptional economics of Chilalo project: Graphex Mining Ltd., September 20, 40 p. (Accessed December 6, 2019, at <http://www.graphexmining.com.au/wp-content/uploads/2018/09/0191.pdf>.)
- Graphex Mining Ltd., 2019, Definitive feasibility study update: Graphex Mining Ltd., December 3, 5 p. (Accessed September 10, 2020, at <https://www.investi.com.au/api/announcements/gpx/4528f4b8-9f1.pdf>.)
- Gravita India Ltd., 2019, Gravita Tanzania Limited commences commercial production of lead: Gravita India Ltd., April 18. (Accessed October 2, 2020, at <https://www.gravitaindia.com/category/news/>.)
- Helium One Ltd., 2017, For the technology of today and the future: Helium One Ltd., [unpaginated]. (Accessed May 21, 2018, at <http://www.helium-one.com/investors/>.)
- International Cement Review, 2018a, African aspirations: International Cement Review, July, p. 154–158.
- International Cement Review, 2018b, Capacity expansion continues: International Cement Review, July, p. 124–130.
- Intra Energy Corporation Ltd., 2017, Annual financial report for the year ended 30 June 2017: Intra Energy Corporation Ltd., 76 p. (Accessed September 18, 2018, at <http://intraenergycorp.com.au/annual-reports/>.)
- Intra Energy Corporation Ltd., 2019, Annual financial report for the year ended 30 June 2019: Intra Energy Corporation Ltd., 74 p. (Accessed September 23, 2020, at <http://intraenergycorp.com.au/annual-reports/>.)
- Kahn, Jeremy, 2020, What is tanzanite? It just made this man a millionaire. And proved African mining reforms can work: Fortune, June 26. (Accessed October 2, 2020, at <https://fortune.com/2020/06/26/what-is-tanzanite-africa-mining-millionaires/>.)
- Kalkine Media, 2019, Volt Resources envisages natural graphite supply leader position through Bunyu project by 2020: Kalkine Media, August 27. (Accessed October 1, 2020, at <https://kalkinemedia.com/au/news/volt-resources-envisages-natural-graphite-supply-leader-position-through-bunyu-project-by-2020>.)
- Katoro Gold plc, 2017, Imweru project's pre-feasibility study expanded to include a LiDAR survey: Katoro Gold plc, November 24. (Accessed September 14, 2018, at <https://katorogold.com/index.php/investors/regulatory-news/>.)
- Katoro Gold plc, 2019, Term sheet regarding potential US\$1.0 million disposal of Imweru gold project: Katoro Gold plc, August 22. (Accessed September 14, 2020, at <https://katorogold.com/index.php/investors/regulatory-news/>.)
- Kibo Mining plc, 2017, Kibo announces completion of integrated bankable feasibility study: Kibo Mining plc, January 23, 3 p. (Accessed November 7, 2018, at <https://kibo.energy/index.php/investor-relations/rns-sens-releases/>.)
- Kibo Energy plc, 2020, Annual report and financial statements for the year ended 31 December 2019: Kibo Energy plc, 76. (Accessed October 2, 2020, at <https://kibo.energy/wp-content/uploads/KIBO-Annual-Report-2019-Final.pdf>.)
- Lewis, Ian, 2017, Tanzania's LNG plans remain stalled: Petroleum Economist, October 19. (Accessed September 17, 2018, at <http://www.petroleum-economist.com/articles/politics-economics/africa/2017/tanzanias-lng-plans-remain-stalled>.)
- Lewis, Ian, 2020, Tanzania's LNG hopes on a knife-edge: Petroleum Economist, February 11. (Accessed September 30, 2020, at <https://www.petroleum-economist.com/articles/midstream-downstream/lng/2020/tanzania-s-lng-hopes-on-a-knife-edge>.)
- Magnis Resources Ltd., 2018, Investor presentation: Magnis Resources Ltd., February, 39 p. (Accessed August 7, 2018, at <http://magnis.com.au/announcements/significant-news>.)
- Masare, Alawi, 2020, Video—Magufuli promise for small-scale miners, tourism: The Citizen [Dar es Salaam, Tanzania], September 10. (Accessed October 1, 2020, at <https://www.thecitizen.co.tz/news/VIDEO--Magufuli-promise-for-small-scale-miners--tourism/1840340-5621930-rmaflxz/index.html>.)
- Moore, Katherine, 2016, Huge helium reserve discovered in Tanzania, Africa: Resource World, v. 14, no. 5, August–September, p. 62.
- Musarra, S.P., 2014, Taming Tanzania: OE Magazine, v. 39, no. 7, July, p. 58–59.
- Mzamo, Phila, 2018, New tanzanite location discovered: Mining News, April 10. (Accessed October 2, 2020, at <https://miningnews.co.za/2018/04/10/new-tanzanite-location-discovered/>.)
- National Bureau of Statistics, 2020, Tanzania in figures 2019: National Bureau of Statistics, June, 103 p. (Accessed July 6, 2020, at <https://www.nbs.go.tz/index.php/en/tanzania-in-figures>.)
- Ng'wanakilala, Fumbuka, 2018, Tanzania's new mining rules impose restrictions on foreign banks, insurers: Thomson Reuters, February 20. (Accessed December 11, 2019, at <https://www.reuters.com/article/tanzania-lawmaking-mining/tanzanias-new-mining-rules-impose-restrictions-on-foreign-banks-insurers-idUSL8N1QA519>.)
- Ng'wanakilala, Fumbuka, and Dausen, Nuzulack, 2019, Tanzania says construction of LNG plant to start in 2022: Thomson Reuters, May 28. (Accessed September 30, 2020, at <https://br.reuters.com/article/us-tanzania-lng/tanzania-says-construction-of-lng-plant-to-start-in-2022-idUSKCN1SY1TU>.)
- Olson, D.W., 2021, Graphite (natural): U.S. Geological Survey Mineral Commodity Summaries 2021, p. 72–73.
- Orca Exploration Group Inc., 2019, 2018 annual report: Orca Exploration Group Inc., 93 p. (Accessed September 30, 2020, at <https://orcaenergygroup.com/investors/report-archive/>.)
- Orca Exploration Group Inc., 2020, Annual report & accounts 2019: Orca Exploration Group Inc., 90 p. (Accessed September 30, 2020, at <https://orcaenergygroup.com/investors/report-archive/>.)
- Peak Resources Ltd., 2017, Lower price deck delivers similar BFS results for Ngualla: Peak Resources Ltd., October 12, 57 p. (Accessed October 25, 2017, at www.peakresources.com.au.)
- Peterson, J.B., 2021, Helium: U.S. Geological Survey Mineral Commodity Summaries 2021, p. 76–77.
- Petra Diamonds Ltd., 2019, Interim results for the six months to 31 December 2018: Petra Diamonds Ltd., February 18, 55 p. (Accessed September 22, 2020, at <https://www.petradiamonds.com/investors/results-reports/>.)
- Petra Diamonds Ltd., 2020, Interim results for the six months to 31 December 2019: Petra Diamonds Ltd., February 17, 54 p. (Accessed September 22, 2020, at <https://www.petradiamonds.com/investors/results-reports/>.)
- Reid, Helen, Lewis, Barbara, and Herman, Emmanuel, 2019, Gold rush? Not for us say Tanzania's small-scale miners: Thomson Reuters, October 30. (Accessed October 1, 2020, at <https://www.reuters.com/article/us-tanzania-mining-artisanal-feature/gold-rush-not-for-us-say-tanzanias-small-scale-miners-idUSKBN1X90G0>.)
- Shanta Gold Ltd., 2020, 2019 annual report and accounts: Shanta Gold Ltd., February 28, 84 p. (Accessed September 24, 2020, at <http://www.shantagold.com/investors/financial-reports/>.)
- Sheaffer, K.N., 2021, Gold: U.S. Geological Survey Mineral Commodity Summaries 2021, p. 70–71.
- Solomons, Sascha, 2017, Tanzanian legislation—The bad and the ugly: Mining Review Africa, no. 10, October, p. 26–28.
- Strandline Resources Ltd., 2018, Fungoni project—Updated DFS: Strandline Resources Ltd., November 1, 7 p. (Accessed October 25, 2019, at <http://www.strandline.com.au/irm/content/asx-announcements.aspx?>.)
- Strandline Resources Ltd., 2019, Company overview—November 2019: Strandline Resources Ltd., November, 23 p. (Accessed September 8, 2020, at <http://www.strandline.com.au/irm/content/asx-announcements.aspx?>.)
- Tanzanian Royalty Exploration Corp., 2017, Pathway towards commercial gold production: Tanzanian Royalty Exploration Corp., July 13, 11 p. (Accessed September 19, 2018, at <https://www.prnewswire.com/news-releases/pathway-towards-commercial-gold-production-634266963.html>.)
- Tanzanian Royalty Exploration Corp., 2019, Tanzanian Gold Corporation plans to start mining at Buckreef property; continues focus on the development of the Buckreef shear zone; announces 2019 year end results: Tanzanian Royalty Exploration Corp., November 29, 2 p. (Accessed September 8, 2020, at <https://www.tangoldcorp.com/category/press-release/>.)

Thomson Reuters, 2019, Barrick Gold reaches deal with Tanzania over Acacia Mining: Thomson Reuters, October 20. (Accessed October 2, 2020, at <https://www.reuters.com/article/us-barrick-gold-tanzania-idUSKBN1WZ0DL>.)

Walkabout Resources Ltd., 2019, Lindi Jumbo graphite project: Walkabout Resources Ltd., October 25, 52 p. (Accessed September 12, 2020, at <https://www.wkt.com.au/investor-information/asx-announcements/>.)

Washbourne, Michael, 2016, Magnis charges ahead at Nachu: Australia's Paydirt, v. 1, no. 241, August, p. 64–65.

Wentworth Resources plc, 2020, Annual report and financial statements 2019: Wentworth Resources plc, April 24, 122 p. (Accessed September 17, 2020, at <https://wentplc.com/investors/reports-results-and-presentations/>.)

Zavala, G.F., 2017, Small ventures, big hopes: International Institute for Environment and Development, September 26. (Accessed March 1, 2018, at <https://www.iied.org/small-ventures-big-hopes>.)

TABLE 1
TANZANIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2015	2016	2017	2018	2019
METALS					
Bauxite	50,000 ^e	72,779	12,090	7,140	--
Copper, mine, concentrates, Cu content	16,800	17,400	15,800	10,000	10,000
Gold, mine, Au content kilograms	43,780	45,883	43,490	39,304 ^r	48,408
Iron and steel:					
Steel:					
Raw steel ^c	210,000	230,000	250,000	300,000	300,000
Products, rolled	142,963	154,079	183,337	224,402	203,018
Silver, mine, Ag content kilograms	15,569	17,984	10,911	12,041	12,550
Tin, mine, Sn content	179 ³	138 ³	91	8	10 ^e
INDUSTRIAL MINERALS					
Cement, hydraulic thousand metric tons	3,135	4,071	4,200	4,509	6,514
Clay, kaolin	1,953	656	13,816	129,383	15,343
Diamond, gem and industrial carats	216,491	239,896	304,456	383,391	416,750
Gemstones, excluding diamond:					
Alexandrite kilograms	-- ^e	-- ⁴	1	1 ^e	1 ^e
Amethyst do.	59,000 ^e	88,636	19,937	20,000 ^e	20,000 ^e
Aquamarine do.	16,000 ^e	31,161	5,967	6,000 ^e	6,000 ^e
Emerald do.	90 ^e	42	12	12 ^e	12 ^e
Garnet do.	130,000 ^e	244,490	131,278	130,000 ^e	130,000 ^e
Quartz do.	90,000 ^e	145,785	71,275	71,000 ^e	71,000 ^e
Ruby ^e do.	18,000 ^r	19,000 ^r	20,000 ^r	20,000 ^r	20,000
Sapphire ^e do.	1,400 ^r	500 ^r	500 ^r	500 ^r	500
Sunstone do.	20,000 ^e	10,298	9,377	9,400 ^e	9,400 ^e
Tanzanite do.	6,370 ^{r,3}	30,875 ^r	21,582 ^r	22,000 ^{r,e}	22,000 ^e
Tourmaline do.	49,000 ^e	23,464	33,041	33,000 ^e	33,000 ^e
Gypsum, mine	239,302	213,744	123,645	241,259	256,529
Lime	88,617	238,776	26,918	27,000 ^e	27,000 ^e
Phosphate rock:					
Gross weight	50,000 ^e	23,658	15,896	--	--
P ₂ O ₅ content	14,000 ^e	6,900 ^e	4,600 ^e	--	--
Pumice and related materials, pozzolan	342,628	230,045	79,085	91,645	263,064
Salt, all types	92,158	170,553	100,017	36,392	99,510
Stone, sand, and gravel, construction:					
Sand and gravel, sand	10,000,000 ^e	12,916,978	7,743,254	8,300,000 ^e	12,000,000 ^e
Stone:					
Crushed, limestone	4,443,600	4,170,057	3,300,899	2,944,000 ^r	5,527,000
Other, size and shape unspecified:					
Calcite	-- ^e	1	1	1 ^e	1 ^e
Marble	43,000 ^e	58,512	42,729	43,000 ^e	43,000 ^e
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous	255,884	276,030	558,553	627,652 ^r	712,136
Natural gas, marketable million cubic meters	1,057 ^r	1,447 ^r	1,469 ^r	1,722 ^r	1,792

^eEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through September 28, 2020. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, smelter copper, refined aluminum and lead, other gemstones (including cordierite and spinel), and raw construction materials (including brick clay) may have been produced, but available information was inadequate to make reliable estimates of output.

³Reported exports.

⁴Production was less than 1/2 kilogram.

TABLE 2
TANZANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum, refined, secondary		Gravita Tanzania Ltd. (Gravita India Ltd.)	Plant near Dar es Salaam	6,000.
Cement		Dangote Cement plc	Plant at Mtwara	3,000,000.
Do.		Tanzania Portland Cement PLC (Scancem International DA, 69.3%)	Plant at Wazo Hill	2,200,000.
Do.		Tanga Cement PLC [AfriSam Consortium (Pty) Ltd., 62.5%]	Plant at Tanga	1,800,000.
Do.		ARM Cement Ltd.	Plant at Dar es Salaam ¹	1,600,000.
Do.		Mbeya Cement Company Ltd. (LafargeHolcim Ltd., 61.5%)	Plant at Mbeya	1,100,000.
Do.		Lake Cement Ltd.	Plant at Kimbiji	500,000.
Do.		Kisarawe Cement Ltd.	Plant at Nazimuzubwi	108,000.
Coal, bituminous		Intra Energy Corporation Ltd., 70%, and National Development Corp., 30%	Ngaka Mine in Ruvumu District	960,000.
Do.		Edenville Energy plc	Rukwa Mine near Sumbawanga	120,000.
Copper, mine		Artisanal and small-scale miners	Mine at Mbesa	12,000. ^c
Do.		Twiga Minerals Corp. (Barrick Gold Corp., 100%)	Buzwagi Mine in Shinyanga Region ¹	4,200.
Do.		do.	Bulyanhulu Mine near Kahama ¹	3,200.
Diamond	carats	Williamson Diamonds Ltd. (Petra Diamonds Ltd., 75%, and Government, 25%)	Williamson Mine near Shinyanga	450,000. ^c
Do.	do.	El Hlall Minerals Ltd.	Mine near Shinyanga	17,000. ^c
Do.	do.	Artisanal and small-scale miners	do.	12,000. ^c
Gemstones:				
Emerald		do.	Mines near Lake Manyara	NA.
Ruby		do.	Mundarara Mine near Longido	NA.
Tanzanite	kilograms	TanzaniteOne Mining Ltd. [Sky Associates Ltd., 50%, and State Mining Corp. (STAMICO), 50%]	Mine at Merelani, Block C	2,000. ^c
Do.		Kilimanjaro Mines Ltd.	Mine at Merelani, Block A	NA.
Do.		Artisanal and small-scale miners	Mines at Merelani, Blocks B and D	NA.
Do.		Tanzanite Africa Ltd. (IPP Media Ltd.)	Mine at Merelani, Block D Extension	NA.
Gold	kilograms	Twiga Minerals Corp. (Barrick Gold Corp., 100%)	North Mara Mine in Tarime District	11,500.
Do.	do.	do.	Bulyanhulu Mine near Kahama	10,500. ²
Do.	do.	do.	Buzwagi Mine in Shinyanga Region	4,800.
Do.	do.	Geita Gold Mining Ltd. (AngloGold Ashanti Ltd., 100%)	Geita Mine near Nyakabale	18,800.
Do.	do.	Shanta Gold Ltd.	New Luika Mine in Songwe Region	2,600.
Do.	do.	Stamigold Co. Ltd. [State Mining Corp. (STAMICO)]	Biharamulo Mine in Kagera Region	1,200. ^c
Do.	do.	Artisanal and small-scale miners	Mines in various locations	5,200. ^c
Lead, refined, secondary		Gravita Tanzania Ltd. (Gravita India Ltd.)	Plant near Dar es Salaam	3,000.
Lime		Neelkanth Lime Ltd.	Plant at Tanga	180,000.
Do.		Athi River Mining Ltd. (ARM)	Plant at Tanga ¹	40,000.
Natural gas	million cubic meters	Etablissements Maurel et Prom SA, 48.06%; Wentworth Resources plc, 31.94%; Tanzania Petroleum Development Corp., 20%	Gasfield at Mnazi Bay	2,170.
Do.	do.	Orca Exploration Group Inc.	Gasfield on Songo Songo Island	1,770.
Phosphate rock		Minjingu Mines and Fertilizers Ltd. (Mac Group of Companies)	Mine at Minjingu ¹	100,000.
Salt		Nyanza Mines (Tanganyika) Ltd. (Mac Group of Companies)	Nyanza Mines at Uvinza	60,000.
Silver	kilograms	Twiga Minerals Corp. (Barrick Gold Corp., 100%)	Bulyanhulu Mine near Kahama	8,900.
Do.	do.	do.	Buzwagi Mine in Shinyanga Region ¹	4,300. ^c
Do.	do.	do.	North Mara Mine in Tarime District	1,300. ^c
Do.	do.	Shanta Gold Ltd.	New Luika Mine in Songwe Region	3,400. ^c
Do.	do.	Geita Gold Mining Ltd. (AngloGold Ashanti Ltd., 100%)	Geita Mine near Nyakabale	2,300. ^c
Steel		Aluminum Africa Ltd.	Plant at Dar es Salaam	70,000 ^c rolled.
Do.		MM Integrated Steel Mills Ltd.	do.	36,000 ^c rolled.
Do.		Aluminum Africa Ltd.	do.	70,000 galvanized.
Do.		MM Integrated Steel Mills Ltd.	do.	36,000 galvanized.

^cEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Not operating at the end of 2019.

²Only 1,600 kilograms per year of capacity was available because underground mining operations were on care-and-maintenance status.