

# POTASH

[Data in thousand metric tons of potassium oxide (K<sub>2</sub>O) equivalent unless otherwise noted]

**Domestic Production and Use:** In 2021, the estimated sales value of marketable potash, free on board (f.o.b.) mine, was \$520 million, which was 24% higher than that in 2020. Potash denotes a variety of mined and manufactured salts that contain the element potassium in water-soluble form. In agriculture, the term potash refers to potassic fertilizers, which are potassium chloride (KCl), potassium sulfate or sulfate of potash (SOP), and potassium magnesium sulfate (SOPM) or langbeinite. Muriate of potash (MOP) is an agriculturally acceptable mix of KCl (95% pure or greater) and sodium chloride for fertilizer use. The majority of U.S. production was from southeastern New Mexico, where two companies operated two underground mines and one deep-well solution mine. Sylvinite and langbeinite ores in New Mexico were beneficiated by flotation, dissolution-recrystallization, heavy-media separation, solar evaporation, and (or) combinations of these processes. In Utah, two companies operated three facilities. One company extracted underground sylvinite ore by deep-well solution mining. Solar evaporation crystallized the sylvinite ore from the brine solution, and a flotation process separated the MOP from byproduct sodium chloride. The firm also processed subsurface brines by solar evaporation and flotation to produce MOP at its other facility. Another company processed brine from the Great Salt Lake by solar evaporation to produce SOP and other byproducts.

The fertilizer industry used about 85% of U.S. potash sales, and the remainder was used for chemical and industrial applications. About 60% of the potash produced was SOPM and SOP, which are required to fertilize certain chloride-sensitive crops. The remainder of production was MOP and was used for agricultural and chemical applications.

**Salient Statistics—United States:**

	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021<sup>e</sup></u>
Production, marketable <sup>1</sup>	480	520	510	460	480
Sales by producers, marketable <sup>1</sup>	490	520	480	500	530
Imports for consumption	5,860	5,710	5,150	5,370	7,000
Exports	128	105	145	147	100
Consumption, apparent <sup>1,2</sup>	6,200	6,100	5,500	5,700	7,400
Price, average, all products, <sup>3</sup> f.o.b. mine, dollars per ton of K <sub>2</sub> O	770	750	820	850	980
Price, average, muriate, f.o.b. mine, dollars per ton of K <sub>2</sub> O	410	440	480	450	550
Employment, mine and mill, number	900	900	900	900	900
Net import reliance <sup>4</sup> as a percentage of apparent consumption	92	92	91	92	93

**Recycling:** None.

**Import Sources (2017–20):** Canada, 75%; Russia, 10%; Belarus, 8%; and other, 7%.

<u>Tariff:</u>	<u>Item</u>	<u>Number</u>	<u>Normal Trade Relations</u> <u>12–31–21</u>
	Potassium nitrate	2834.21.0000	Free.
	Potassium chloride	3104.20.0000	Free.
	Potassium sulfate	3104.30.0000	Free.
	Potassic fertilizers, other	3104.90.0100	Free.

**Depletion Allowance:** 14% (domestic and foreign).

**Government Stockpile:** None.

**Events, Trends, and Issues:** In 2021, U.S. potash consumption and trade reached record levels driven by high crop prices, increased planted crop area, and increased crop exports. This was a continuation of the trend that began late in 2020, as markets rebounded from poor weather conditions in the growing season and high potash stocks. The North American price of potash also increased substantially owing to increased consumption and tighter supplies. Industrial potash consumption continued to be lower, primarily for oil- and gas-well-drilling additives. The number of active oil- and gas-well-drilling rigs gradually increased throughout the year but was still well below the level before the COVID-19 pandemic.

On November 9, 2021, a proposed revised U.S. critical minerals list was published in the Federal Register (86 FR 62199). The new list contained 50 individual mineral commodities; proposed changes were the addition of nickel and zinc and the removal of helium, potash, rhenium, strontium, and uranium, which were included in the 2018 critical minerals list.

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World potash consumption in 2021 for fertilizers was estimated to have increased to 45 million tons from 44 million tons in 2020, as demand peaked in the first half of the year in major consuming regions. Asia and South America continued to be the leading consuming regions. North America and South America and southeast Asia had the largest increases in consumption over that of 2020. World potash production increased, owing primarily to increased output in the major exporting countries of Belarus, Canada, and Russia to meet high demand in the first half of the year.

In August 2021, the United States imposed economic sanctions on Belarus for violations of international law, which included the state-run potash producer. The sanctions did not include the state-run exporting company for Belarus, and potash imports from Belarus continued, but at a lower volume because many buyers used other sources owing to uncertainty of future sanctions.

A new potash mine was in the development stage and pending operating permits in Osceola County, MI. The proposed solution mine would have an initial production capacity of 650,000 tons per year of MOP and was planned to increase to 1 million tons per year.

World annual potash capacity was projected to increase to near 69 million tons in 2025 from 62.3 million tons in 2021. Most of the increase would be MOP from new mines and expansion projects in Belarus, Canada, and Russia. New SOP mines were planned in Australia and Eritrea, and a polyhalite mine in the United Kingdom would also contribute to the capacity growth. New MOP mines in Brazil, Canada, Ethiopia, Morocco, Spain, and the United States were planned to begin operation past 2025 but could be delayed because of future unfavorable economic conditions or lack of funding.

**World Mine Production and Reserves:** Reserves for Russia were updated with the Australasian Joint Ore Reserves Committee (JORC)-compliant reserves reported by the producing companies.

	Mine production		Reserves <sup>5</sup>	
	2020	2021 <sup>e</sup>	Recoverable ore	K <sub>2</sub> O equivalent
United States <sup>1</sup>	460	480	970,000	220,000
Belarus	7,400	8,000	3,300,000	750,000
Brazil	254	210	10,000	2,300
Canada	13,800	14,000	4,500,000	1,100,000
Chile	900	900	NA	100,000
China	6,000	6,000	NA	350,000
Germany	2,200	2,300	NA	150,000
Israel	2,280	2,300	NA	<sup>6</sup> Large
Jordan	1,590	1,600	NA	<sup>6</sup> Large
Laos	270	300	500,000	75,000
Russia	8,110	9,000	NA	400,000
Spain	420	400	NA	68,000
Other countries	360	370	1,500,000	300,000
World total (rounded)	44,000	46,000	>11,000,000	>3,500,000

**World Resources:**<sup>5</sup> Estimated domestic potash resources total about 7 billion tons. Most of these lie at depths between 1,800 and 3,100 meters in a 3,110-square-kilometer area of Montana and North Dakota as an extension of the Williston Basin deposits in Manitoba and Saskatchewan, Canada. The Paradox Basin in Utah contains resources of about 2 billion tons, mostly at depths of more than 1,200 meters. The Holbrook Basin of Arizona contains resources of about 0.7 to 2.5 billion tons. A large potash resource lies about 2,100 meters under central Michigan and contains more than 75 million tons. Estimated world resources total about 250 billion tons.

**Substitutes:** No substitutes exist for potassium as an essential plant nutrient and as an essential nutritional requirement for animals and humans. Manure and glauconite (greensand) are low-potassium-content materials that can be profitably transported only short distances to crop fields. Glauconite is used as a potassium source for organic farming.

<sup>e</sup>Estimated. NA Not available.

<sup>1</sup>Data are rounded to no more than two significant digits to avoid disclosing company proprietary data.

<sup>2</sup>Defined as sales + imports – exports.

<sup>3</sup>Includes MOP, SOP, and SOPM. Does not include other chemical compounds that contain potassium.

<sup>4</sup>Defined as imports – exports.

<sup>5</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>6</sup>Israel and Jordan recover potash from the Dead Sea, which contains nearly 2 billion tons of potassium chloride.