

# Mineral Industry Surveys

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## MARKETABLE PHOSPHATE ROCK AND POTASH—CROP YEAR 2023

Because the growth cycles for most agricultural commodities do not coincide with the calendar year, the fertilizer industry tracks fertilizer use by crop year (July 1 through June 30 of 2 consecutive years). Taking that into account, the U.S. Geological Survey compiles phosphate rock and potash data by calendar year and crop year.

### Marketable Phosphate Rock

Phosphate rock data for this report were collected through semiannual canvasses of U.S. phosphate rock producers. Three of the six companies that produced phosphate rock in the United States participated in the voluntary surveys in the crop year, representing less than 50% of the production, use, and value data shown in the tables. Data for nonrespondent companies were estimated from individual company financial reports. U.S. production of marketable phosphate rock was estimated to be 19.5 million metric tons (Mt) in crop year 2023, which ended June 30, 2023, compared with 20.7 Mt in crop year 2022 (tables 1, 2).

Marketable phosphate rock sold or used was estimated to be 19.9 Mt, compared with 21.3 Mt in crop year 2022 (tables 1, 3). The manufacturing of wet-process phosphoric acid for fertilizers and animal feed supplements was estimated to have accounted for more than 95% of phosphate rock consumption. The remainder was used to produce defluorinated phosphate rock, elemental phosphorus, and ground phosphate rock for organic farming.

Domestic apparent consumption was estimated to be 22.6 Mt, compared with 23.7 Mt in crop year 2022. Estimated producers' stocks decreased by 4% to 9.72 Mt in crop year 2023, from 10.1 Mt in crop year 2022 (table 1).

The average unit value of marketable phosphate rock used in the United States was estimated to be \$99 per metric ton, compared with \$87 per metric ton in crop year 2022. Imports of phosphate rock increased by 14% to 2.76 Mt compared with 2.42 Mt in crop year 2022 (table 1). U.S. phosphate rock mining companies reported no exports of phosphate rock in crop year 2023.

### Potash

Potash data for this report were collected through semi-annual canvasses of U.S. potash producers. Two of the three companies that produced potash in the United States participated in the voluntary surveys, representing less than 50% of the production, use, and value data shown in the tables. Data for nonrespondent companies were estimated from individual company financial reports.

U.S. production of potash was 410,000 metric tons (t) of K<sub>2</sub>O equivalent in crop year 2023 compared with 450,000 t in crop year 2022. Sales of potash were 410,000 t in crop year 2023, which were 7% less than those in crop year 2022 (table 4).

Imports of potash decreased slightly to 5.21 Mt of K<sub>2</sub>O from 5.33 Mt in crop year 2022. The total customs value of potash imports was \$3.94 billion, which was 3% lower than that in crop year 2022 (tables 4, 7). Exports decreased by 15% to 232,000 t of K<sub>2</sub>O from 272,000 t in crop year 2022. The total value of exports decreased to \$92.5 million from \$289 million in crop year 2022 (tables 4, 6).

The total value of potash sales decreased by 6% to \$610 million from \$650 million in crop year 2022 (table 4). The average unit value for all forms of potash (K<sub>2</sub>O equivalent) was essentially unchanged from that in crop year 2022. The average unit value for standard muriate of potash (MOP) decreased by 10% from that in crop year 2022 and the average unit value for granular MOP, decreased by 18% from that in crop year 2022 (table 5).

Apparent consumption of all forms of potash decreased slightly to 5.4 Mt of K<sub>2</sub>O from 5.5 Mt in crop year 2022 (table 4).

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TABLE 1  
SALIENT U.S. PHOSPHATE ROCK STATISTICS<sup>1</sup>

(Thousand metric tons and thousand dollars)

	Crop year <sup>2</sup>	
	2022	2023
Mine production (crude ore)	87,900	87,000
Marketable phosphate rock production	20,700	19,500
P <sub>2</sub> O <sub>5</sub> content	5,820	5,530
Value <sup>e</sup>	1,840,000	2,060,000
Average, dollars per metric ton <sup>e, 3</sup>	89.00	106.00
Sold or used by producers	21,300	19,900
P <sub>2</sub> O <sub>5</sub> content	5,930	5,640
Value <sup>e</sup>	1,850,000	1,980,000
Average, dollars per metric ton <sup>e, 3</sup>	87.00	99.00
Imports for consumption: <sup>4</sup>	2,420	2,760
Cost, insurance, and freight value	242,000	449,000
Average, dollars per metric ton	99.87	163.00
Consumption <sup>5</sup>	23,700	22,600
Stocks, June 30, producers <sup>e</sup>	10,100	9,720

<sup>e</sup>Estimated.

<sup>1</sup>Data are rounded to no more than three significant digits, except prices.

<sup>2</sup>July 1-June 30.

<sup>3</sup>Average value is based on sold or used values.

<sup>4</sup>Source: U.S. Census Bureau.

<sup>5</sup>Expressed as sold or used plus imports.

TABLE 2  
PRODUCTION OF PHOSPHATE ROCK IN THE UNITED STATES<sup>1</sup>

(Thousand metric tons and thousand dollars)

Period	Mine production, crude ore		Marketable production, beneficiated			Stocks, End of period, rock
	Rock	P <sub>2</sub> O <sub>5</sub> content	Rock	P <sub>2</sub> O <sub>5</sub> content	Value <sup>2</sup>	
Crop Year 2022:	87,900	7,730	20,700	5,820	1,840,000 <sup>e</sup>	10,100
Crop Year 2023: <sup>e</sup>						
July–December 2022	41,100	3,670	9,760	2,760	969,000	19,600
January–June 2023	46,000	3,940	9,750	2,770	1,090,000	9,720
Total	87,000	7,620	19,500	5,530	2,060,000	XX

<sup>e</sup>Estimated. XX Not applicable.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Based on the per ton sold or used values.

TABLE 3  
PHOSPHATE ROCK SOLD OR USED BY PRODUCERS  
IN THE UNITED STATES<sup>1</sup>

(Thousand metric tons and thousand dollars)

Period	P <sub>2</sub> O <sub>5</sub>		Value <sup>2</sup>
	Rock	content	
Crop Year 2022:	21,300	5,930	1,850,000 <sup>e</sup>
Crop Year 2023: <sup>e</sup>			
July–December 2022	9,330	2,650	919,000
January–June 2023	10,600	2,990	1,060,000
Total	19,900	5,640	1,980,000

<sup>e</sup>Estimated.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Free on board mine.

TABLE 4  
SALIENT POTASH STATISTICS<sup>1,2</sup>

(Thousand metric tons and thousand dollars unless otherwise specified)

	Year ending June 30	
	2022	2023
United States:		
Production: <sup>3</sup>		
Gross weight	1,300	1,200
K <sub>2</sub> O equivalent	450	410
Sales by producers:		
Quantity: <sup>3</sup>		
Gross weight	1,200	1,200
K <sub>2</sub> O equivalent	440	410
Value <sup>3,4</sup>	650,000	610,000
Average value: <sup>5</sup>		
Gross weight                      dollars per metric ton	535	530
K <sub>2</sub> O equivalent                      do.	1,490	1,500
Exports:		
Gross weight	628	622
K <sub>2</sub> O equivalent	272	232
Value	289,000	92,500
Imports for consumption: <sup>6,7</sup>		
Quantity:		
Gross weight	9,010	8,650
K <sub>2</sub> O equivalent	5,330	5,210
Value, customs	4,060,000	3,940,000
Consumption, apparent: <sup>3,8</sup>		
Gross weight	9,600	9,200
K <sub>2</sub> O equivalent	5,500	5,400

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<sup>1</sup>Includes muriate of potash, sulfate of potash, potassium magnesium sulfate, and some parent salts. Excludes other chemical compounds that contain potassium.

<sup>2</sup>Data are rounded to no more than three significant digits unless otherwise specified.

<sup>3</sup>Data are rounded to no more than two significant digits.

<sup>4</sup>Free on board mine.

<sup>5</sup>Rounded to the nearest \$5 to avoid disclosing proprietary data.

<sup>6</sup>Excludes potassium chemicals and mixed fertilizers.

<sup>7</sup>Includes nitrate of potash.

<sup>8</sup>Calculated from sales plus imports minus exports.

TABLE 5  
PRICES OF U.S. POTASH, BY TYPE AND GRADE<sup>1, 2</sup>

(Dollars per metric ton of K<sub>2</sub>O equivalent)

Type and grade	Crop Year 2022	Crop Year 2023		
	Average value	July–December 2022	January–June 2023	Average value
Muriate, 60% K <sub>2</sub> O minimum:				
Standard	925	1,085	625	835
Granular	895	910	645	730

<sup>1</sup>Average prices, free on board mine, based on sales.

<sup>2</sup>Data rounded to nearest \$5.

TABLE 6  
U.S. EXPORTS OF POTASH<sup>1</sup>  
(Metric tons, unless otherwise specified)

Type	Approximate average K <sub>2</sub> O content (percent)	July–December 2022			January–June 2023			Year ending June 30, 2023		
		Product	K <sub>2</sub> O		Product	K <sub>2</sub> O		Product	K <sub>2</sub> O	
			equivalent	Value (thousands)		equivalent	Value (thousands)		equivalent	Value (thousands)
Potassium chloride, all grades	61	90,300	55,100	\$24,800	120,000	73,400	\$26,300	211,000	128,000	\$51,100
Potassium nitrate	45	2,350	1,060	3,120	4,220	1,900	4,210	6,570	2,960	7,330
Potassium sulfate <sup>2</sup>	25	238,000	59,400	127,000	167,000	41,200	76,200	405,000	101,000	203,000
Total	XX	330,000	116,000	155,000	292,000	116,000	107,000	622,000	232,000	261,000

XX Not applicable.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes potassium magnesium sulfate.

Source: U.S. Census Bureau; adjusted by the U.S. Geological Survey.

TABLE 7  
U.S. IMPORTS FOR CONSUMPTION OF POTASH<sup>1</sup>

(Metric tons, unless otherwise specified)

Type	Approximate average K <sub>2</sub> O content (percent)	July–December 2022			January–June 2023			Year ending June 30, 2023		
		Product	K <sub>2</sub> O equivalent	Customs value (thousands)	Product	K <sub>2</sub> O equivalent	Customs value (thousands)	Product	K <sub>2</sub> O equivalent	Customs value (thousands)
Potassium chloride	61	3,790,000	2,320,000	\$1,990,000	4,520,000	2,770,000	1,670,000	8,310,000	5,090,000	\$3,650,000
Potassium sulfate	51	46,700	23,800	40,300	61,700	31,500	86,200	108,000	55,100	127,000
Potassium nitrate	45	54,300	24,400	48,800	57,900	26,000	52,100	112,000	50,500	101,000
Potassium sodium nitrate mixtures	14	40,300	5,650	30,100	72,100	10,100	28,200	112,000	15,700	58,400
Total	XX	3,930,000	2,370,000	2,100,000	4,720,000	2,840,000	1,830,000	8,650,000	5,210,000	3,940,000

XX Not applicable.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau; adjusted by the U.S. Geological Survey.