

PHOSPHATE ROCK

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Production and consumption

For calendar year 2023, phosphate ore was mined by five companies at nine mines in four states for an estimated 19.5 Mt of marketable product (representing 63 percent of the domestic production

capacity of 31.1 Mt), making the United States responsible for 9.1 percent of the world production of 220 Mt (Table 1). While the U.S. production quantity in calendar year 2023 was similar to that in 2022, U.S. consumption of phosphate rock increased in 2023 due to increased use related to favorable weather conditions during the planting season.

China has revised its phosphate rock production information to only report production from large mines, which totaled 85 to 93 Mt as compared to earlier reported annual production at 140 Mt. Morocco’s production was 35 Mt in calendar year 2023, approximately 16 percent of the world’s production (Table 1). Figure 1 shows the U.S. proportion of world phosphate production from 1900 through to the present day.

Imports and exports

There were no reported U.S. exports of phosphate rock in crop year 2023; nor have there been any reported exports of phosphate rock since crop year 2004. U.S. producers continue to prefer to export the higher-value fertilizer products, such as monoammonium phosphate (MAP), diammonium

phosphate (DAP) and triple super phosphate (TSP), in preference to phosphate rock. Approximately 25 percent of the MAP, DAP and TSP produced in calendar year 2023 were exported.

Importation of phosphate rock in calendar 2023 is estimated by the U.S. Geological Survey (USGS) at 2.59 Mt as compared to 2022 imports of 2.5 Mt. Imports were from Morocco (2 percent) and Peru (98 percent).

Uses

The manufacturing of fertilizers and the production of animal feed supplements account for more than 95 percent of phosphate rock consumption. Major fertilizers include DAP, MAP and TSP. The balance is used in a variety of products, such as vitamins, pharmaceuticals, soft drinks, toothpaste, flame retardants, glass, photographic film and

Table 1

World phosphate production and U.S. position. (Source: Stephen M. Jasinski, USGS Mineral Commodity Summaries, January 2023, pp. 124–125 Phosphate Rock)

Calendar year	Production ^{1,2}				U.S. (percent)	Morocco ³ (percent)
	World	China	Morocco ³	U.S.		
2018	267.0	140.0	33.0	25.7	9.63	12.36
2019	227.0	95.0	35.5	23.3	10.26	15.64
2020	223.0	90.0	37.0	23.5	10.54	16.59
2022 ¹	228.0	93.0	39.0	19.8	8.68	17.11
2023 ¹	220.0	90.0	35.0	20.0	9.09	15.91

¹Estimated for 2022 and 2023 ²Million metric tons ³Includes Western Sahara

Figure 1

U.S. proportion of world phosphate production. (Modified from data compiled by D.A. Buckingham and S.M. Jasinski, USGS)

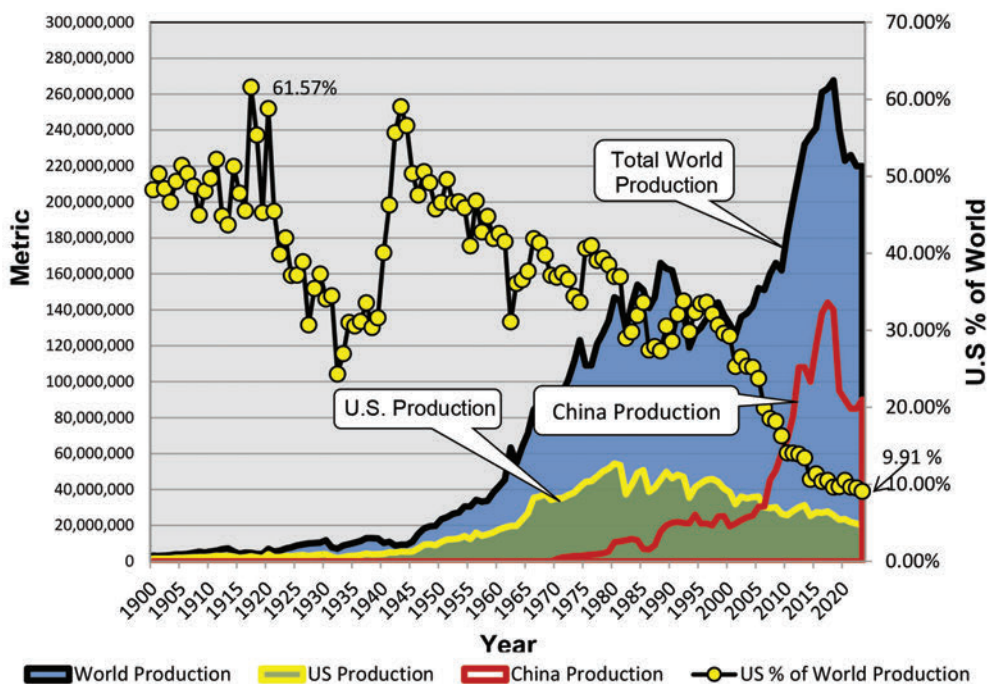


Table 2

Phosphate rock prices. (Source: USGS Mineral Industry Surveys, Stephen M. Jasinski, Mineral Industry Survey Marketable Phosphate Rock in January 2023, Tables 2 and 3, and 2023 Annual Phosphate Rock, pp. 134 and 135)

Phosphate use	Calendar year				
	2019	2020	2021	2022	2023
Domestic production (FOB mine ¹)	\$67.90	\$75.50	\$84.80	\$136.00	\$147.32
Exports (FOB port ¹)	N/A	N/A	N/A	N/A	N/A
Imports (CIF ¹)	\$72.56	\$74.55	\$84.80	\$135.60	\$147.32

¹Price (U.S. dollars per metric ton)

other consumer goods. Continued growth of the world population and the need for dependable food supplies underscore the need for phosphate fertilizers. There is no natural or synthetic substitute for phosphorus, which is essential for life in all growing things: plants and animals alike.

Prices

Calendar year. The 2023 calendar year average price at the mine was reported at \$147.32/t, 8.3 percent higher than the calendar year 2022 average price of \$136.00/t (Table 2). The price of imported phosphate also increased to \$147.32/t in calendar year 2023 from \$135.60/t in 2022 (Table 2). Phosphate prices decreased significantly in December 2023.

Morocco. Morocco phosphate rock prices at 70 percent BPL increased from \$300.00/t in January 2023 to a high of \$347.50/t during September through November 2023, closing in December 2023 at \$152.50/t.

Fertilizers. DAP spot prices, U.S. Gulf granular, free on board, decreased from \$631.00/t in January 2023 to a low of \$454.00/t in June, closing in December 2023 at \$563.75/t. TSP decreased from \$569.38/t in January 2023 to a low of \$390.00/t in June, closing in December 2023 at \$447.50/t.

Industry news

There are currently only two phosphate rock producers mining in Florida, one in the central district (Mosaic) and one in the north district (Nutrien Ltd). There is only one producer in North Carolina: Nutrien Ltd. In the Western states of Idaho and Utah, there are currently three producers: Bayer, which acquired Monsanto; Itafos, a Brazilian operation, which acquired Nutrien; and J.R. Simplot. The Bureau of Land Management (BLM) is the leading agency for administering and approving phosphate mining and manages more than 245 million acres of public land. The Pocatello field office of the BLM currently has five large, active phosphate mines in southeast Idaho.

China has transitioned from the largest importer of phosphate to the largest exporter of phosphate. At the present time, China has imposed measures including export quotas and lengthy inspection requirements on fertilizer ingredients, which has cooled domestic prices and reduced exports. In 2023, China exports were reported to be less than in prior years.

In Saudi Arabia, Ma'aden's phosphate mine is currently producing up to 5 Mt/a of concentrated phosphate rock from its beneficiation plant. Peru is also producing close to 5 Mt annually.

Environmental, regulatory and reclamation issues

Mosaic has continued to mine the newly permitted extension reserves of its Wingate East Mine, South

Pasture Mine Extension, Ona Mine and the newly permitted South Fort Meade Eastern Extension Mine, all in Florida. Permit applications to further extend the South Fort Meade Eastern reserves, consisting of approximately 6,000 acres further east in Hardee County, were approved in 2023.

The future Desoto Mine was denied mining permits by the local county. Public information workshops are still being held at the county level prior to any future county commission hearings.

Exploration activities on Western phosphate lands have been extensive over the past few years. The permitting activities included extensions of existing phosphate mines, expansions of existing mines, or new phosphate mines.

In June 2023, the Federal District Court of Idaho vacated the BLM's approval of the Caldwell Canyon Mine. Bayer has since provided a new revised mine and reclamation plan, and the BLM restarted the permitting and National Environmental Policy Act (NEPA) process in November 2023. The BLM anticipates a new decision sometime in early 2025.

Trends and outlook

According to the USGS, domestic production and consumption in 2023 were essentially unchanged from 2022. Favorable weather conditions in the planting seasons helped to increase fertilizer consumption and reduce phosphate fertilizer stocks that had accumulated in 2022.

Global production of phosphate rock was estimated to be lower in 2023 at 220 Mt, compared to 228 Mt in 2022. Global production of phosphorus pentoxide, P₂O₅, is expected to increase from 63.6 Mt in 2023 to 69.1 Mt by 2027.

Most of the near-term increases in world production that are expected to be completed by 2026 are ongoing in Brazil, Kazakhstan, Mexico, Morocco and Russia. New mining projects that are planned to be completed after 2027 are under development in Australia, Canada, Congo (Brazzaville), Guinea-Bissau and Senegal.

