

PHOSPHATE ROCK

(Data in thousand metric tons, unless otherwise noted)

Domestic Production and Use: Phosphate rock ore was mined by 10 firms in 4 States, and upgraded into an estimated 39.7 million tons of marketable product valued at \$1 billion, f.o.b. mine. Florida and North Carolina accounted for 85% of total domestic output, with the remainder produced in Idaho and Utah. More than 90% of the U.S. phosphate rock ore produced was used to manufacture wet-process phosphoric acid and superphosphoric acid, which were used as intermediates in the manufacture of granular and liquid ammonium phosphate fertilizers and animal feed supplements. More than 50% of the wet-process phosphoric acid produced was exported in the form of upgraded granular diammonium and monoammonium phosphate fertilizer, triple superphosphate fertilizer, and merchant grade phosphoric acid. Phosphate rock mined by two companies in Idaho was consumed as feedstock for elemental phosphorus production at two wholly owned electric furnace facilities. Elemental phosphorus was used to produce high-purity phosphoric acid and phosphorus compounds, which were used in a variety of industrial applications.

Salient Statistics—United States:	1996	1997	1998	1999	2000^e
Production ¹	45,400	45,900	44,200	40,600	39,700
Sold or used by producers	43,500	42,100	43,700	41,600	37,800
Imports for consumption	1,800	1,830	1,760	2,170	1,900
Exports	1,570	335	378	272	250
Consumption ²	43,700	43,600	45,000	43,500	39,500
Price, average value, dollars per ton, f.o.b. mine ³	23.40	24.40	25.46	30.56	26.16
Stocks, producer, yearend	6,390	7,910	7,920	6,920	8,000
Employment, mine and beneficiation plant, number ^e	6,500	6,500	6,500	6,500	6,000
Net import reliance ⁴ as a percent of apparent consumption	—	—	3	7	1

Recycling: None.

Import Sources (1996-99): Morocco, 99%; and other, 1%.

Tariff: Item	Number	Normal Trade Relations 12/31/00
Natural calcium phosphates:		
Unground	2510.10.0000	Free.
Ground	2510.20.0000	Free.

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: In 2000, domestic phosphate rock production decreased slightly, however, consumption for fertilizer production dropped substantially. Producers in Florida and North Carolina were affected by lower export sales and prices, which was the result of the opening of new phosphoric acid and diammonium phosphate (DAP) plants in Asia. One mine in Florida closed permanently in August owing to market conditions and the company began using phosphate rock imported from Morocco at its fertilizer plant. Since mid-1999, four mines have closed in Florida as part of corporate restructuring programs and depletion of reserves. Overall, production in the Florida-North Carolina region was below 90% of rated annual capacity. Mine production in Idaho and Utah was higher than in 1999.

Production of DAP, the major phosphate fertilizer, was lower than last year because the export market, which is the driving force of U.S. production, remained weak. The largest producer of processed phosphates temporarily closed some facilities in late 1999, and made additional closures in July 2000. This reduced its DAP production capacity by more than 50%. The company reopened some of the plants in September. Exports of DAP to India were down substantially owing to several new plants in the region that commenced production and Indian Government subsidy programs. Although the facilities in both India and Australia experienced various problems that kept output lower than expected, it did not benefit U.S. companies greatly. China has emerged as the important market for domestic DAP. The China National Chemicals and Import and Export Corporation (Sinochem), signed a 2-year extension to the existing DAP purchase agreement.

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A new mine and fertilizer plant has been proposed to be built in northeastern Utah. The company would obtain ore from a deposit near Vernal and would process it at a plant near Bonanza. The major products would be animal feed supplements and fertilizers. The firm plans to process ore at the mine site using a European method that would not require clay settling ponds or phosphogypsum stacks. The byproduct phosphogypsum would be free of impurities and would be used to manufacture wallboard. The company was in the process of obtaining financing for the project.

The two elemental phosphorus producers entered into a joint-venture agreement to manufacture and market phosphorus chemicals. The new company also will produce purified phosphoric acid in Soda Springs, ID, in a partnership with a fertilizer manufacturer. This would result in reduced production of elemental phosphorus at its Pocatello, ID, facility, which will assist in bringing the plant into compliance with environmental regulations.

World demand for phosphate fertilizers will continue to expand in relation to increased world population and food requirements, with the largest growth occurring in developing nations. The United States remains the world's largest producer of phosphate rock and processed phosphates and the leading supplier of DAP. However, increased foreign competition has removed a significant portion from U.S. sales. Domestic fertilizer consumption should increase slightly as total acreage planted for the major crops is projected to increase. The current market conditions will likely prevail until the full impact of new plants in Asia is determined and how quickly domestic manufacturers can increase sales in other regions. Phosphate rock production is likely to continue to decline in Florida, as companies adjust production to meet demand and prolong reserves. Several replacement mines are planned, but have to undergo permitting procedures that can take several years.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁵	Reserve base ⁵
	1999	2000 ^e		
United States	40,600	39,700	1,000,000	4,000,000
Brazil	4,100	4,300	330,000	370,000
China	25,100	26,000	500,000	1,200,000
Israel	4,100	3,800	180,000	180,000
Jordan	6,000	6,000	900,000	1,700,000
Morocco and Western Sahara	24,000	21,000	5,700,000	21,000,000
Russia	11,100	11,000	150,000	1,000,000
Senegal	1,800	1,800	50,000	160,000
South Africa	2,900	2,600	1,500,000	2,500,000
Syria	2,100	2,400	60,000	100,000
Togo	1,700	1,500	30,000	60,000
Tunisia	8,000	8,000	100,000	600,000
Other countries	<u>9,500</u>	<u>11,200</u>	<u>1,200,000</u>	<u>4,000,000</u>
World total (rounded)	141,000	139,000	12,000,000	37,000,000

World Resources: Phosphate rock resources occur principally as sedimentary marine phosphorites. The largest deposits are found in northern Africa, China, the Middle East, and the United States. Significant igneous occurrences are found in Brazil, Canada, Russia, and South Africa. Large phosphate resources have been identified on the continental shelves and on seamounts in the Atlantic Ocean and the Pacific Ocean, but cannot be recovered economically with current technology.

Substitutes: There are no substitutes for phosphorus in agriculture.

^eEstimated.

¹Marketable.

²Defined as sold or used plus imports minus exports.

³Marketable phosphate rock, weighted value, all grades, domestic and export.

⁴Defined as imports - exports + adjustments for Government and industry stock changes.

⁵See Appendix C for definitions.