

POTASH

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Potash is used primarily as an agricultural fertilizer (plant nutrient) because it is a source of soluble potassium, one of the three primary plant nutrients; the others are fixed nitrogen and soluble phosphorus. Potash and phosphorus are mined products, and fixed nitrogen is produced from the atmosphere by using industrial processes. Modern agricultural practice uses these primary nutrients in large amounts plus additional nutrients, such as boron, calcium, chlorine, copper, iron, magnesium, manganese, molybdenum, sulfur, and zinc, to assure plant health and proper maturation. The three major plant nutrients have no substitutes, but low-nutrient-content, alternative sources of plant nutrients, such as animal manure and guano, bone meal, compost, glauconite, and "tankage" from slaughterhouses, can be used.

Potash denotes a variety of mined and manufactured salts, all containing the element potassium in water-soluble form. Potash can be potassium chloride [KCl, or muriate of potash (MOP)], potassium sulfate [K₂SO₄, or sulfate of potash (SOP), a manufactured product], potassium-magnesium sulfate [K₂SO₄·2MgSO₄, or sulfate of potash magnesia (SOPM or K-Mag)], potassium nitrate (KNO₃, or saltpeter, a manufactured product), or mixed sodium-potassium nitrate (NaNO₃+KNO₃, or Chilean saltpeter).

Production

The U.S. Geological Survey (USGS) developed domestic potash data from voluntary semiannual surveys of U.S. operations. Of the nine survey requests sent to operations for the first one-half year, eight responded, and of the eight survey requests sent to operations for the second half year, seven responded. Data were estimated for the nonrespondent for both halves of the year. Data from the responding sites are estimated to consist of about 98% of the total production shown in table 1.

Production of all types and grades of potash in the United States could not be reported in 1998 for reasons of proprietary data. The majority of the production was from southeastern New Mexico, where two companies operated five mines, two of which were connected underground. Other States with potash production were Michigan and Utah. U.S. potash producers produce MOP, SOP, and SOPM. Potassium nitrate was also manufactured in the United States. Because four companies produce standard and granular MOP, prices for those products can be reported. All of the SOP and SOPM are produced by the same company, a condition that prevents publishing data that could reveal or allow calculation of company data concerning SOP or SOPM, together known as the "sulfates."

Only four potash-producing companies remain in the United States since Great Salt Lake Minerals Corp., formerly of Harris

Chemical Group, Inc., became part of IMC Kalium Ltd. of IMC Global Inc. in April 1998 (IMC Global Inc., 1999, p. 540). IMC Kalium produced MOP, SOP, and SOPM in Carlsbad, NM, at the operation that was started in 1940, SOPM from the former Western Ag-Mineral Mine property, MOP from the Hersey, MI, solution mine and plant, and SOP from the Great Salt Lake near Ogden, UT. Mississippi Potash, Inc., of Mississippi Chemical Corp. produced MOP from two potash operations near Carlsbad, NM, known as "Mississippi Potash East" and "Mississippi Potash West." In the second quarter, Mississippi Chemical announced an expansion of their "red granular" capacity (i.e., Mississippi Potash West) from 242,000 to 297,000 metric tons, K₂O equivalent (Mississippi Chemical Corp., 1998). This expansion will take place in the mine and mill, thus raising company total capacity to about 600,000 tons.

In Utah, the Reilly-Wendover near-surface brine operation of Reilly Industries, Inc., continued production of MOP and manure salts. The Moab Salt Inc. solution mine and mill continued production of MOP and salt for Potash Corporation of Saskatchewan Inc. (PCS). The remaining life of the Moab solution operation was estimated to be 8 years, at diminishing capacity (Potash Corporation of Saskatchewan Inc., 1999, p. 5). The State of Utah issued final approval for Moab's operating and reclamation plans.

Consumption

At the end of 1997, the prices of grain and of the domestic cattle that eat the grain had been declining for several months as the downward swing in some of the economies in Asia reduced the demand and the prices in Asia for imported grains and meats. Grain shipment fixtures (for oceanic shipments) to Asia dropped off slightly. The fertilizer market, however, still concerned about the problem of small grain stocks of the past several years, only began to notice the price drop and grain buildup in the United States in late summer of 1997. Meanwhile, these grain shipment declines backed up the newly harvested grains into the river barges, covered hoppers, and granaries of the U.S. Midwest. Starting in the summer of 1998, some farmers reduced their applications of fertilizers for the rational expectation of lower prices and sales, and higher grain stock carrovers, leading to little or no positive return from their investment in the 1998 fertilizers. Concerning corn pricing, "For corn, the weather market began to play itself out during the latter half of July as confidence in a good size crop increased. At the beginning of the main planting time around mid-April, the December contract at the Chicago Board of Trade had hovered in the \$2.65 to \$2.70 range. Over the next few weeks, the contract price declined, but it spiked to over \$2.70 at one point in late June. By early August, the corn

contract moved down to as low as \$2.20 per bushel. Cash prices have been trending down for most of the summer. The benchmark Central Illinois cash corn price sank to under \$2.00 a bushel at the end of July and early August, for the first time since early November 1994” (U.S. Department of Agriculture, Economic Research Service, 1998, Price outlook is weak due to big supplies of feed grains and other crops, accessed May 25, 1999, at URL <http://usda.mannlib.cornell.edu/reports/erssor/field/fds-bb/1998/FDS0698.TXT>). The Market Year Average Prices for Illinois corn in dollars per bushel in 1995, 1996, and 1997 were \$3.30, \$2.79, and \$2.70, respectively (U.S. Department of Agriculture, National Agricultural Statistics Service, 1998, Crops by State, accessed May 25, 1999, at URL <http://usda.mannlib.cornell.edu/data-sets/crops/95111/cn198897.csv>). The same held true for soybeans as “The U.S. average farm price fell to \$5.18 (per bushel) in October, the lowest since 1987” (U.S. Department of Agriculture, Economic Research Service, 1998, Advancing harvest, sluggish demand pressure soybean prices to 11-year low, accessed May 26, 1999, at URL <http://usda.mannlib.cornell.edu/reports/erssor/field/ocs-bb/1998/OCS0798.ASC>), and for wheat which was quoted as #2 hard red winter, f.o.b. Gulf about \$123 per ton (\$112 per short ton) down 25% from last year September with stocks-to-use ratio at 21% (U.S. Department of Agriculture, Foreign Agricultural Services, 1998, World wheat situation and outlook, Agriculture, accessed May 24, 1999, at URL http://www.fas.usda.gov/grain/circular/1998/98-09/wht_txt.htm).

The sales of potash started to decline after March as can be seen in data from the Potash & Phosphate Institute (P&PI) monthly data of potash purchased by U.S. fertilizer dealers from Canadian and U.S. potash producers. According to calculations made by using P&PI data, the January-through-June 1998 accumulated-sales were about 8% below and the end-of-year purchases were 5% below the averages of the past 8 years. Compared with those of 1997, shipments of agricultural potash to domestic consumers from U.S. and Canadian producers fell by about 20%. By region, the Corn Belt, which received about 44% of shipments from the two sources, fell by about 19%. The Lake States, which received about 15% of shipments, and Southern Plains, which received more than 3%, fell by about 15% each. Appalachia, which received about 9% of shipments, and the Pacific Region, which received about 4%, fell by about 30% each. Only the combination of Alaska and Hawaii increased their shipments in 1998 compared with those of 1997 and received about 0.2% of total U.S. agricultural shipments.

The U.S. Bureau of the Census import and export data was modified by the USGS. By using these modifications, the apparent consumption of potash for 1998 in the United States was estimated to have declined by about 12%, to about 5.7 million tons, compared with that of 1997. Some of this decline came from the estimated decrease in U.S. production, and some came from the decline in imports from Canada. Exports of sulfates increased marginally, and imports of SOP from Germany increased marginally.

Transportation

Shipments within the United States were disrupted to some degree in 1998 by the after effects of the Union Pacific-Southern Pacific merger, which caused traffic delays in the south-central Plains during summer and fall 1997. This caused rail car shortages and higher prices for truck freightage in the Southwest, which probably hurt domestic potash producers’ sales more than potash imports on the northern border.

In late 1997, Canpotex/Hall-Buck Terminal’s covered storage facility in Portland, OR, began operation. On July 1, Kinder Morgan Energy Partners LP acquired Hall-Buck Marine, Inc. and its 10% of the terminal, as well as 19 other bulk terminals for approximately \$100 million (Kinder Morgan Energy Partners LP, 1999, p. 5). It became Kinder Morgan Bulk Terminals Inc. Canpotex Bulk Terminals Ltd. maintained ownership of the remaining 90% portion of the terminal.

A Russian transportation official announced the construction of a new port on the Gulf of Finland within Russian borders, to be called Ust Luga (Fertilizer Week, 1998b). Throughput capacity was projected to be 6 million tons per year of dry bulk products, such as fertilizers. It may take some strain off of the Latvian potash port of Ventspils.

In blue water transportation, the Baltic Freight Index dipped to around 800 in August (Hayley-Bell, 1998). This seemed to indicate that some shippers were not covering capital costs and possibly some portion of “out-of-pocket” costs. This index covers Atlantic Ocean and Pacific Ocean round trips in Panamax and smaller sized cargo ships. Additionally, the traffic from the Asia Pacific to North America and Europe was much stronger than usual as Asian companies tried to earn their way out of the recession by exporting to the West. Not much food and grain traveled to Asia owing to Asia’s common viewpoint of selling, not purchasing, during these times of deflated currency and underemployment. Relatively lower transportation rates to Asia just maintained domestic export tonnages at 1997’s levels while Canada’s much larger exports stayed near 1997’s tonnages.

Foreign Trade

Some of the potassium chloride exported from Canada to Asia Pacific passed through Portland, OR, and was incorrectly noted as imported for consumption and as U.S. product exports. These quantities were approximated by the USGS, and those approximations were used to correct imports from Canada and exports to Asia Pacific. U.S. sales to Asia Pacific, after correction, were about the same as those of 1997.

Total potash exports, by K₂O tonnage, by the United States increased by about 3% from those of 1997. MOP was about 47% of exports; SOP, about 31% of exports; SOPM about 21%, and potassium nitrate, 1%. About 41% of total exports was MOP to Latin America, up by about 11% from those of 1997; about 20% was SOP going to Asia Pacific, down by about 9% from those of 1997; about 10% was SOP going to Latin America, up by about 36% from those of 1997; and about 9% was SOPM going to Latin America, comparable with those of 1997.

World Review

The estimate of world potash production for 1998 was down slightly from that of 1997 owing to the Asia Pacific economy problems and the ripple effect through parts of the rest of the world.

Canada.—Early in the year, following the announcement of the elimination of the highest (50%) tax bracket on potash profits by the Province of Saskatchewan, IMC Global announced that IMC Kalium planned to expand production capacity at the Belle Plaine solution mine operation by 435,400 tons, to about 1.74 million tons (IMC Global Inc., 1998). IMC Kalium will also expand the Colonsay underground mine operation by 381,000 tons to 1.2 million tons. The cost of both of these expansions was \$115 million, plus or minus \$10 million. The solution mine expansion investment will be about \$170-per-ton-per-year capacity, and the underground mine will be about \$105-per-ton-per-year capacity. IMC Kalium also announced an expenditure \$175 million total for “diversification and efficiency” capital among all four of the mines over a 5-year period. On March 3, PCS purchased Potash Company of Canada Limited’s Potacan Mining Co. property in New Brunswick—a flooded mine and a functioning mill. The operation, renamed PCS Cassidy Lake Ltd., has an annual milling capacity of 780,000 tons and an annual compaction capacity of 600,000 tons of granular potash. A rail car unloading facility was installed at the mill to receive standard-grade potash from Rocanville for upgrading into granular product. Since the acquisition, 170,000 tons has been compacted at Cassidy Lake, which had 30 employees (Potash Corporation of Saskatchewan Inc., 1999, p. 12). At the end of the year, PCS “purchased 9% of the shares of Israel Chemicals Ltd. (ICL) from the Government of Israel in an offering that sold off the remaining government ownership in that company. The most important asset of ICL is its ownership in Dead Sea Works, the fifth largest potash exporter in the world” (Potash Corporation of Saskatchewan Inc., 1999, p. 7).

Chile.—The Aguas Blancas Project of Atacama Minerals Corp. of Canada received financing from ABN AMRO Bank and Dresdner Bank Canada in March and began construction of initial processing facilities and infrastructure in April. Later in the year, the project received funding from the Chilean State Foreign Investment Committee (Fertilizer Week, 1998a). This will be a multiproduct project, and potassium nitrate production has been projected to range from about 30,000 to 35,000 tons per year.

The Minera Yolanda S.C.M. project of Kap Resources Ltd. of Canada started up its first plant which is located in the Tarapaca region during the year (Industrial Minerals, 1998c). This project will buy potassium chloride from Canada and convert mined sodium nitrate to potassium nitrate. The maximum output of potassium nitrate will be of 130,000 tons per year.

Ethiopia.—Norsk Hydro A/S agreed to explore the Dallol sylvinite-carnallite deposit (Fertilizer International, 1998). Should this resource be profitable to mine and beneficiate, this would add a source of potash to Norsk Hydro’s present line of ammonium products.

European Union.—The European Commission (EC)

reviewed the antidumping duties from 1994 against the potash imports from Belarus, Russia, and Ukraine (Industrial Minerals, 1998a). The EC decided to stay with a combination of the minimum import price and a specific duty.

France.—Entreprise Minière et Chimique’s Mines de Potasse d’Alsace (MDPA) closed the Mine Marie-Louise Est at Staffelfelden after 85 years of operation (Phosphorus & Potassium, 1998b). With the closing of the Clover Hill Mine in New Brunswick, Canada, owing to mine flooding, MDPA had only two mines, both in France. When the last mine is exhausted and shut down in 2004, MDPA will be without a company-owned supply of potash.

MDPA owned 51% of a deep resource in the Esterhazy Member of the Prairie Evaporite in the Elk Point Basin on the western edge of Manitoba, Canada. In 1977, the Holle Mine in Congo (Brazzaville), on the west coast of Africa, was flooded while being mined by a French-Congolese company. Reopening the Holle Mine for potash production was deemed technically infeasible even though the possibility of solution mining for magnesium brine from the carnallite ($KCl \cdot MgCl_2 \cdot 6H_2O$) had been investigated (Industrial Minerals, 1998b). For example, Billiton International Metals B.V. continued to solution mine deep (1,500-meter [m] to 2,500-m) carnallite under the Netherlands near Veendam for magnesium-laden brine to produce refractory-grade magnesia, but has never attempted to recover the potassium chloride at that site (Pettifer, 1981).

Germany.—At the beginning of the year, BASF AG reduced its 74% holding in Kali und Salz Beteiligungs AG by 25%, which was sold to private investors. In midyear, Kali und Salz Beteiligungs purchased the 49% of Kali und Salz GmbH that the State’s Merger-Related Special Tasks Office held when the East German and West German potash industry was combined into Kali und Salz GmbH.

Israel.—The Government of Israel sold its remaining 31.5% holding of ICL, which owned 90% of the Dead Sea Works Ltd. (DSW), among others, in a public offering. PCS purchased a 9% share of ICL (See “Canada” above.) In the meantime, the DSW led two Spanish partners into a deal that purchased the Grupo Potasas, the manager of Suria KSA and Potasas del Llobregat SA, the remaining Spanish potash producers. They outbid Société Commercial des Potasses de l’Azote of France and PCS (Fertilizer Markets, 1998).

Jordan.—Arab Potash Co. through its 51%-owned Jordan Dead Sea Industries Co. (JODICO) signed a memorandum of understanding (MOU) with a Taiwanese chemical company to produce potassium sulfate and sodium tripolyphosphate in Jordan. The Ching Hsiang Chemicals Co. of Taiwan will supply engineering and equipment for the plant at Aqaba (Phosphorus & Potassium, 1998c). The plant’s potassium sulfate capacity was forecast to be about 20,000 tons. Arab Potash signed a letter of intent to develop a potassium nitrate/dicalcium nitrate plant with Kemira Agro of Finland at one of two sites (Phosphorus & Potassium, 1998a). Potassium nitrate capacity was forecast to be about 68,000 tons per year. Inputs to the plant will be imported ammonia and domestic chemical-grade potassium chloride.

Russia.—The Berezhniki potash complex, about 200 kilometers (km) north of Perm and west of the Ural Mountains,

started a potassium sulfate plant that will use ammonium sulfate as a source of sulfate in an ion exchange process (Louis, 1998).

Spain.—Grupo Potasas, which managed the two remaining potash mines and mills (Llobregat and Suria K) in Catalonia, was privatized during 1998 by being sold to DSW and two Spanish partners (Fertilizer Markets, 1998). The Cardona Mine and mill in Catalonia closed in 1990, and in Navarre, the Pamplona Mine and mill closed sometime in 1994-95, while the Sabiza Mine closed in May 1997.

Thailand.—Norsk Hydro (Asia) Pte. Ltd. signed a MOU with Asia Pacific Resources Ltd. to develop the more recently discovered Samboon deposit rather than the nearby Udon deposit. The MOU was for the parties to enter into an Offtake and Marketing Agreement for Asia Pacific Potash Corp., the operator of the new mine (Asia Pacific Resources Ltd., June 22, 1998, Norsk Hydro joins Asia Pacific Resources Ltd. for the comprehensive development of the Udon Thani Potash Concessions in northeast Thailand, assessed at URL http://www.crewgroup.com/apq/062298_2.html). “The deal is subject to agreement about the extent of Norsk Hydro’s investment and equity in the project” (Financial Times, 1998, p. 24).

United Kingdom.—The only potash mine in England, Cleveland Potash Ltd., was on the eastern coast near Boulby, which is also the western edge of the Zechstein Basin of northwestern Europe. The mine was the deepest mine in Europe with shafts down 1,150 m; the ore zone dips deeper. The mine, producing since 1976, seemed to have leveled off in its annual production quantity. Distances from the production shaft to the working areas are 9 km to the north and 6 km to the south. In February 1997, the operators received permission to work to the southwest for another 25 years of mine life; and the operators expected the maximum depth to be 1,450 m (Mining Journal, 1998). Rock temperatures range from 35° C in the north to 45° C in the south. Mining was done with a four-panel advance (face) with the two outer panels driven first, then the two inner panels; this collapses the outer two but protects the inner two panels. This is much like the four- or five-panel faces used in some Saskatchewan mines. Larger curtain walls were left between faces with an underground recovery (extraction) ratio of 30% to 32%; the ratio will probably decrease as the mining approaches the 1,450 m depth.

Outlook

Domestic potash sales have been overtaken by external forces as Asian consumers purchased grains only from local sources and less imported meat. To maintain lower production costs, the Asian grain growers will probably continue to purchase potash from Canadian potash producers. Domestic potash demand by farmers for grain crops will be down for 1999, partly because of large grain stocks at the end of 1998 relative to annual consumption and partly because of lower domestic demand for grain feeding of livestock raised for meat sales to Asia Pacific. At this time (1998), the decline in grain exports to Asia in 1999 will be dependent on the sizes of crops from countries that compete with U.S. farmers for sales to grain importers around the world and the ability of the Asian grain importers to pay for the imports.

The Central European countries appear to be increasing their purchases of potash as their economies recover from the dissolution of one form of economic order and the institution of another. Agricultural consumption in Belarus, Russia, and Ukraine may begin to recover as the governments begin to support loans to the farmers. With loans, the farmers could buy fertilizers and pesticides, as well as other agricultural necessities. Then, if the weather cooperates and the farmers receive an adequate return on their investment, the agricultural industry will provide more grain and other food stuffs to their countries, reducing imports.

References Cited

- Fertilizer International, 1998, Ethiopian potash prospects: Fertilizer International, no. 362, January-February, p. 16.
- Fertilizer Markets, 1998, Spain’s potash producer, Grupo Potasas, will be sold to a consortium headed by Israel’s Dead Sea Works for Pta17.2 billion: Fertilizer Markets, v. 9, no. 1, July 27, p. 5.
- Fertilizer Week, 1998a, Atacama Minerals gets financing: Fertilizer Week, v. 11, no. 41, March 2, p. 2-3.
- 1998b, Ust Luga begins building new terminal: Fertilizer Week, v. 11, no. 38, February 9, p. 1.
- Financial Times, 1998, Norsk Hydro looks at potash project: [London] Financial Times, June 29, p. 24.
- Hayley-Bell, Andrew, 1998, Freight market report: Industrial Minerals, no. 371, August, p. 64.
- IMC Global Inc., 1998, IMC Global announces long-term potash capacity expansions at two mines in Saskatchewan, Canada following announcement of important revisions to Provincial Potash Resource Tax System: IMC Global Inc., press release, February 9, 2 p.
- 1999, Form 10-K—1998: Securities and Exchange Commission, 606 p.
- Industrial Minerals, 1998a, EU reviews KCl duties on Russia and Belarus: Industrial Minerals, no. 367, April, p. 29.
- 1998b, New potash source in development: Industrial Minerals, no. 369, June, p. 13.
- 1998c, Yolanda nitrates operating successfully: Industrial Minerals, no. 373, October, p. 11.
- Kinder Morgan Energy Partners LP, 1999, Form 10-K405-1998: Securities and Exchange Commission, 335 p.
- Louis, P.L., 1998, (Untitled): 1998 IFA Production and International Trade Committee Meeting, Amman Jordan, October 18-19, 9 p.
- Mining Journal, 1998, Cleveland Potash into the 21st century: [London] Mining Journal, v. 331, no. 8507, November 20, p. 402.
- Mississippi Chemical Corp., 1998, Mississippi Chemical announces potash capacity expansion: Yazoo City, MS, Mississippi Chemical Corp., press release, April 29, 1 p.
- Pettifer, Lee, 1981, The industrial minerals of the Netherlands: Industrial Minerals, no. 167, September, p. 53-55.
- Phosphorus & Potassium, 1998a, Arab Potash and Kemira potassium nitrate JV: Phosphorus & Potassium, no. 216, July-August, p. 7.
- 1998b, High price of rundown of French mining operations: Phosphorus & Potassium, no. 216, July-August, p. 8.
- 1998c, JODICO signs MOU for Jordanian potassium sulfate plant: Phosphorus & Potassium, no. 216, July-August, p. 8.
- Potash Corporation of Saskatchewan Inc., 1999, Form 10-K-1998: Securities and Exchange Commission, 137 p.

SOURCES OF INFORMATION

U.S. Geological Survey Publications

- Potash Ch. in Mineral Commodity Summaries, annual.¹
- Potash Ch. in Mineral Industry Surveys, Crop year (July 1- June 30) annual.¹
- Evaporites and brines. Ch. in United States mineral resources, U.S. Geological Survey Professional Paper 820, 1973.

¹Prior to January 1996, published by the U.S. Bureau of Mines.

Other

Potash resources, Ch. in Industrial Minerals and Rocks, 6th Ed., Carr, D. Sr. Ed., AIME, Society of Mining, Metallurgy, and Exploration, Inc. 783-802, 1994.

CRU Publishing Ltd., London: Phosphorus & Potassium, bimonthly. Fertilizer International, Monthly.

British Sulphur North America Inc., Greenbelt, MD. Fertilizer Markets, weekly.

Natural Resources Canada, Mining Sector, Ottawa, Canada. Potash Ch., Canadian Minerals Yearbook, annual

Fertecon Ltd., London. World Fertilizer Review, monthly.

FMB Publications Ltd., Middlesex, England. Fertilizer Focus, monthly.

Industrial Minerals Information Ltd., of Metal Bulletin plc., London. Industrial Minerals, monthly.

Reed Business Publishing Ltd., Surrey, England. European Chemical News, weekly.

Pike & Fischer Publications. Green Markets, weekly.

Potash & Phosphate Institute, Norcross, GA.

Supply-Disappearance Statistics, monthly, quarterly, and annually.

United Nations, Food and Agricultural Organization, Rome. Annual Fertilizer Review, annual.

TABLE 1
SALIENT POTASH STATISTICS 1/ 2/

(Thousand metric tons and thousand dollars, unless otherwise specified)

	1994	1995	1996	1997	1998
United States:					
Production	2,830	3,050	2,890	2,900 3/	3,000 3/
K ₂ O equivalent	1,400	1,480	1,390	1,400 3/	1,300 3/
Sales by producers	2,970	2,880	2,960	3,000 3/	2,900 3/
K ₂ O equivalent	1,470	1,400	1,430	1,400 3/	1,300 3/
Value 4/	\$284,000	\$284,000	\$299,000	\$320,000	\$320,000
Average value per ton of product	dollars \$95.93	\$98.58	\$101.08	\$110.00 r/ 5/	\$115.00 5/
Average value per ton of K ₂ O equivalent	do. \$193.50	\$202.43	\$208.57	\$230.00 r/ 5/	\$250.00 5/
Exports 6/	997	938	1,100	1,070	1,120
K ₂ O equivalent	464	409	481	466	480
Imports for consumption 6/ 7/	7,930	7,960	8,140	9,030	7,870
K ₂ O equivalent	4,800	4,820	4,940	5,490	4,780
Customs value	\$642,000	\$602,000	\$563,000	\$610,000	\$648,000
Consumption, apparent 8/	9,890	9,900	10,000	11,000 3/	9,700 9/
K ₂ O equivalent	5,810	5,820	5,890	6,500 3/	5,700 9/
World: Production, marketable K ₂ O equivalent	23,100	24,600 r/	23,200 r/	25,500 r/	25,100 e/

e/ Estimated. r/ Revised.

1/ Includes muriate and sulfate of potash, potassium magnesium sulfate, and some parent salts. Excludes other chemical compounds containing potassium.

2/ Data are rounded to three significant digits, except prices; unless otherwise specified.

3/ Data rounded to within 100,000 tons to avoid disclosing proprietary data.

4/ F.o.b. mine.

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

6/ Excludes potassium chemicals and mixed fertilizers.

7/ Includes nitrate of potash.

8/ Calculated from sales plus imports minus exports.

9/ Data rounded to within 200,000 tons to avoid disclosing proprietary data.

TABLE 2
PRODUCTION OF CRUDE ORE IN NEW MEXICO 1/

(Thousand metric tons)

Period	Crude salts 2/ (mine production)	
	Gross weight	K ₂ O equivalent
1997:		
January-June	6,730	807
July-December	6,570	799
Total	13,300	1,610
1998:		
January-June	5,840	675
July-December	6,240	715
Total	12,100	1,390

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Sylvinites and langbeinites.

TABLE 3
SALES OF NORTH AMERICAN POTASH, BY STATE OF DESTINATION 1/

(Metric tons of K₂O equivalent)

State	Agricultural potash		Nonagricultural potash	
	1997	1998	1997	1998
Alabama	103,000	77,600	231,000	221,000
Alaska	719	587	2,830	4,130
Arizona	5,380	3,500	1,290	2,100
Arkansas	81,900	60,200	383	544
California	129,000	85,400	13,700	12,800
Colorado	18,400	16,800	1,790	2,000
Connecticut	3,450	2,040	1,450	1,730
Delaware	32,300	21,400	58,200	54,100
Florida	186,000	127,000	8,810	11,300
Georgia	195,000	133,000	1,990	1,280
Hawaii	5,770	6,990	11	22
Idaho	43,200	39,000	1,090	1,270
Illinois	690,000	566,000	21,000	13,200
Indiana	412,000	353,000	17,100	25,200
Iowa	512,000	391,000	8,410	6,520
Kansas	61,100	39,700	7,470	7,320
Kentucky	172,000	96,600	1,380	1,270
Louisiana	93,700	61,600	4,620	3,750
Maine	6,330	3,410	437	408
Maryland	35,600	29,800	868	664
Massachusetts	4,230	2,100	1,010	4,440
Michigan	216,000	195,000	8,460	9,520
Minnesota	354,000	287,000	6,250	4,900
Mississippi	115,000	92,400	24,100	46,100
Missouri	375,000	247,000	10,100	3,620
Montana	19,600	17,200	154	316
Nebraska	55,200	45,700	2,460	2,310
Nevada	851	455	814	615
New Hampshire	539	278	79	90
New Jersey	8,330	4,830	2,000	1,360
New Mexico	6,470	6,770	20,500	17,900
New York	81,100	58,500	2,450	2,930
North Carolina	166,000	96,400	1,120	633
North Dakota	34,700	29,500	5,280	230
Ohio	409,000	375,000	85,800	99,200
Oklahoma	24,000	15,200	7,090	7,550
Oregon	50,200	35,100	1,550	1,470
Pennsylvania	64,200	61,000	10,700	7,790
Rhode Island	438	1,640	586	84
South Carolina	80,900	50,700	1,510	1,460
South Dakota	17,400	15,200	495	673
Tennessee	106,000	101,000	1,740	4,680
Texas	155,000	132,000	24,400	21,400
Utah	7,890	7,930	6,110	7,920
Vermont	6,210	5,240	95	64
Virginia	108,000	68,300	672	386
Washington	63,400	42,500	1,250	1,250
West Virginia	3,600	2,390	872	688
Wisconsin	261,000	219,000	60,300	63,500
Wyoming	8,070	3,800	10,300	3,040
Total	5,590,000	4,330,000	682,000	687,000

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: Potash & Phosphate Institute.

TABLE 4
SALES OF NORTH AMERICAN MURIATE OF POTASH
TO U.S. CUSTOMERS, BY GRADE 1/

(Thousand metric tons of K₂O equivalent)

Grade	1997	1998
Agricultural:		
Standard	289	280
Coarse	2,520	2,150
Granular	2,010	1,480
Soluble	531	425
Total	5,350	4,330
Nonagricultural:		
Soluble	63	90
Other	601	595
Total	664	685
Grand total	6,010	5,020

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: Potash & Phosphate Institute.

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

(Dollars per metric ton of K₂O equivalent)

Type and grade	1997		1998	
	January- June	July- December	January- June	July- December
Muriate, 60% K ₂ O minimum:				
Standard	137.00	139.00	144.00	146.00
Granular	145.00	153.00	200.00	169.00

1/ Average prices, f.o.b. mine, based on sales.

2/ Data rounded to nearest dollar.

TABLE 6
U.S. EXPORTS OF POTASH, BY TYPE 1/

	Approximate average K ₂ O content (percent)	Quantity (metric tons)	
		Product	K ₂ O equivalent
1997:			
Potassium chloride, all grades	61	365,000	223,000
Potassium sulfate	51	288,000	147,000
Potassium magnesium sulfate	22	404,000	88,900
Potassium nitrate	45	15,900	7,140
Total	XX	1,070,000	466,000
1998:			
Potassium chloride, all grades	61	364,000	222,000
Potassium sulfate	51	290,000	152,000
Potassium magnesium sulfate	22	449,000	98,700
Potassium nitrate	45	15,400	6,910
Total	XX	1,120,000	480,000

XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

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

TABLE 7
U.S. EXPORTS OF POTASH, BY COUNTRY 1/

(Metric tons of product)

Country	Potassium chloride		Potassium sulfate, all grades 2/		Potassium nitrate		Total	
	1997	1998	1997	1998	1997	1998	1997	1998
Argentina	41	5,400	13,100	11,700	--	--	13,200	17,100
Australia	39	63	4,040	5,480	10	--	4,090	5,550
Belgium	--	18,500	12	--	--	--	12	18,500
Brazil	55,000	29,900	9,780	964	154	235	64,900	31,100
Canada	3,730	2,890	78,900	85,400	5,150	6,890	87,700	95,200
Chile	16,700	865	36,300	38,500	--	63	53,000	39,500
China	--	--	185,000	144,000	--	4	185,000	144,000
Colombia	1,040	12,600	20,300	24,000	--	--	21,300	36,600
Costa Rica	46,700	5,260	56,200	57,400	--	--	103,000	62,700
Dominican Republic	24,600	15,200	6,440	7,030	19	19	31,000	22,300
Ecuador	7,070	8,420	16,400	2,070	6	12	23,400	10,500
France	9	2	--	1,120	--	--	9	1,130
Guatemala	7	10	8,850	5,270	1	--	8,860	5,280
Honduras	457	2,340	5,650	15,800	155	120	6,260	18,200
Italy	30,800	217	11	21	--	--	30,900	238
Japan	13,000	10,100	129,000	163,000	111	--	142,000	173,000
Korea, Republic of	9,370	--	5,600	6,000	226	--	15,200	6,000
Malaysia	--	--	204	14,000	2,070	2,130	2,280	16,100
Mexico	82,900	147,000	75,300	95,700	6,870	5,300	165,000	248,000
Peru	95	1,940	10,200	18,800	--	--	10,300	20,800
Philippines	18	--	5,530	--	--	--	5,540	--
Thailand	--	--	600	4,180	--	--	600	4,180
Venezuela	16,800	10,800	12,900	6,200	17	30	29,700	17,000
Other	56,800	93,200	12,100	31,900	1,070	569	70,000	126,000
Total	365,000	364,000	692,000	738,000	15,900	15,400	1,070,000	1,120,000

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes potassium magnesium sulfate.

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

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF POTASH, BY TYPE 1/

	Approximate average K ₂ O content (percent)	Quantity (metric tons)		Value (thousands)	
		Product	K ₂ O equivalent e/	Customs	C.i.f.
1997:					
Potassium chloride	61	8,940,000	5,450,000	\$590,000	\$685,000
Potassium sulfate	51	56,300	29,700	11,400	12,900
Potassium nitrate	45	19,200	8,640	5,430	6,190
Potassium sodium nitrate mixture	14	19,900	2,790	3,060	3,520
Total	XX	9,030,000	5,490,000	610,000	707,000
1998:					
Potassium chloride	61	7,730,000	4,720,000	619,000	697,000
Potassium sulfate	51	94,600	48,200	19,400	21,600
Potassium nitrate	45	23,900	10,700	6,170	6,910
Potassium sodium nitrate mixture	14	21,200	2,970	3,190	3,770
Total	XX	7,870,000	4,780,000	648,000	729,000

e/ Estimated. XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: Bureau of the Census.

TABLE 9
U.S. IMPORTS FOR CONSUMPTION OF POTASH, BY COUNTRY 1/

Country	Potassium chloride (metric tons)		Potassium sulfate (metric tons)		Potassium nitrate (metric tons)		Potassium sodium nitrate (metric tons)		Total (metric tons)		Total value (thousands)			
											Customs		C.i.f.	
	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998
Belarus	6,800	275,000	--	--	--	--	--	--	6,800	275,000	\$607	\$23,600	\$709	\$26,100
Belgium	--	--	42	84	--	--	--	--	42	84	13	26	14	26
Canada	8,450,000	7,140,000	7,750	10,700	4	30	571	706	8,460,000	7,150,000	556,000	572,000	646,000	644,000
Chile	--	--	20	1,400	14,300	22,500	19,400	20,500	33,700	44,400	6,820	8,770	7,700	10,000
Denmark	--	--	2	8	357	--	4	--	363	8	129	5	161	6
Germany	5,500	2,320	48,200	81,800	143	1	--	--	53,900	84,100	9,660	16,000	11,100	17,900
Israel	2	18	--	--	3,930	822	--	8	3,930	848	1,100	329	1,350	416
Japan	82	1	219	50	387	317	--	--	688	368	575	289	656	315
Mexico	--	--	--	--	--	1	--	--	--	1	--	2	--	2
Netherlands	--	30	--	--	--	--	--	--	--	30	--	6	--	6
Poland	--	--	--	--	69	127	--	--	69	127	40	69	46	80
Russia	472,000	316,000	--	--	--	--	--	--	472,000	316,000	34,900	26,900	39,500	30,400
United Kingdom	109	196	1	--	--	--	--	--	110	196	105	11	117	12
Other	207	--	46	536	16	90	--	--	269	626	91	88	113	92
Total	8,940,000	7,730,000	56,300	94,600	19,200	23,900	19,900	21,200	9,030,000	7,870,000	610,000	648,000	707,000	729,000

1/ Data are rounded to three significant digits; may not add to totals shown.

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

TABLE 10
MARKETABLE POTASH: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons of K₂O equivalent)

Country	1994	1995	1996	1997	1998 e/
Belarus	3,021	3,211	2,720	3,250 r/	3,400
Brazil	234	215	243	243 e/	243
Canada	8,037	8,855	8,120	9,235 r/	9,000
Chile	21 r/	23 r/	21 r/	22 r/	22
China e/	74	80	110	115	120
France	870	799	751	725 r/	656 3/
Germany	3,286	3,278	3,332	3,423	3,200
Israel	1,259	1,325	1,500 e/	1,488	1,500
Jordan	930	1,112	1,060 e/	849	850
Russia	2,498	2,800	2,620 e/	3,400 e/	3,500
Spain	684	760	680 e/	640 e/	635
Ukraine	168	110	75 r/ e/	60 r/	60
United Kingdom	580	582	618	565	575
United States	1,400	1,480	1,390	1,400 4/	1,300 4/
Total	23,100	24,600 r/	23,200 r/	25,500 r/	25,100

e/ Estimated. r/ Revised.

1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Table includes data available through March 12, 1999.

3/ Reported figure.

4/ Rounded to within 100,000 tons to avoid disclosing proprietary data.