

# Potash

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The term "potash" refers to a group of potassium-bearing minerals and chemicals. Potash includes potassium chloride (sylvite), potassium-magnesium chloride (carnallite), potassium sulphate, potassium-magnesium sulphate (langbeinite), and potassium nitrate. The dominant potash product in the market is potassium chloride, or KCl, a naturally occurring, pink, salty mineral for which Canada is the world's leading producer and exporter.

The main use of potash is in the agricultural sector where it is used as a plant nutrient for its potassium content, which is the third major nutrient after nitrogen and phosphate. Potash plays an important role in the regulation of plant physiological functions; it

supports plant growth and primarily enhances the efficiency of plants in the uptake of other nutrients, boosting their nitrogen and phosphate absorption. Industrial potash is used in the manufacture of potassium-bearing chemicals, as an alternative to de-icing salt, and as a water conditioner. Other end uses include detergents, ceramics, chemicals and pharmaceuticals.

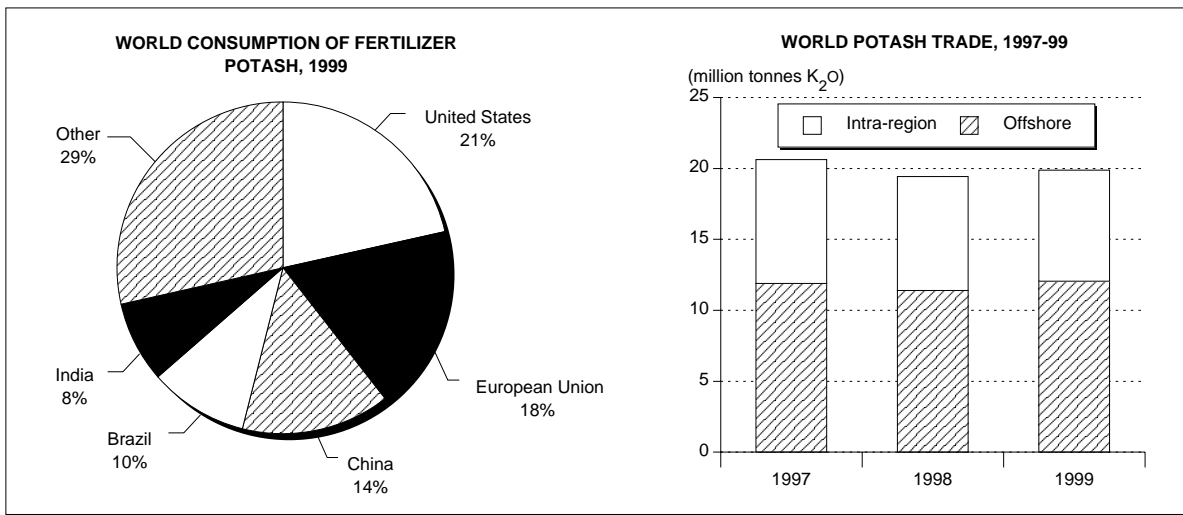
## WORLD OVERVIEW

### World Potash Sales

The year 1999 was one of challenges for the fertilizer industry with historically low prices for grains and fertilizers, lower application rates in North America, and excess supply. Global potash sales rose 2% to 24.7 Mt  $K_2O$ ,<sup>1</sup> along with a slight 3% increase in trade due to strong deliveries to major developing

<sup>1</sup> Unless noted otherwise, statistical data refer to potassium oxide (1 t KCl = 0.6 t  $K_2O$ ).

Figure 1  
Potash Consumption and Trade



Source: Natural Resources Canada.

countries, offsetting a reduction in demand and deliveries in established markets such as North America and Western Europe.

Despite strong 1998/99 world grain production of 1.87 billion t, demand grew marginally to 1.85 billion t, resulting in a slight increase in grain inventories and the stock-to-use ratio, which reached 19%. The resilient weak grain prices caused a significant reduction in harvested area and application rate, which resulted in reduced fertilizer usage.

World potash fertilizer sales in 1999 were estimated at 22.8 Mt  $K_2O$ , a 2.7% increase over 1998. Strong sales to China, India, Vietnam and South Korea offset weaker sales in other countries, notably France, the United States, Brazil and Japan. Potash imports in China registered a 15% increase over 1998; however, despite improving potash sales, the nitrogen-to-potash ratio remained deficient. Potash sales in India showed a sustained increase from the 1998 level, supported by a higher subsidy level for potash fertilizers, which rose by 50% to 3000 rupees (Rs) per tonne of KCl (US\$71/t) and was applied retroactively to the Kharif 1998 season (April-September). In February 1999, an import duty of 5.5% on fertilizers affected the delivered prices of potash by raising its costs by up to Rs300/t (US\$7/t). In Brazil, the lack of agricultural credit and a devaluation of the currency led to a reduction in fertilizer imports in the first half of 1999; in the second half of the year, demand picked up as credit terms improved. Brazil was the third largest potash-consuming country, consuming slightly more than 2.3 Mt/y  $K_2O$ , or 10% of global fertilizer use. In the United States, total potash sales were down due to wet weather in the spring planting

season. In the fall, good weather conditions helped boost potash application; however, high volumes were offset by weaker prices. Winter fill shipments were relatively sustained and boded well for potash consumption in 2000.

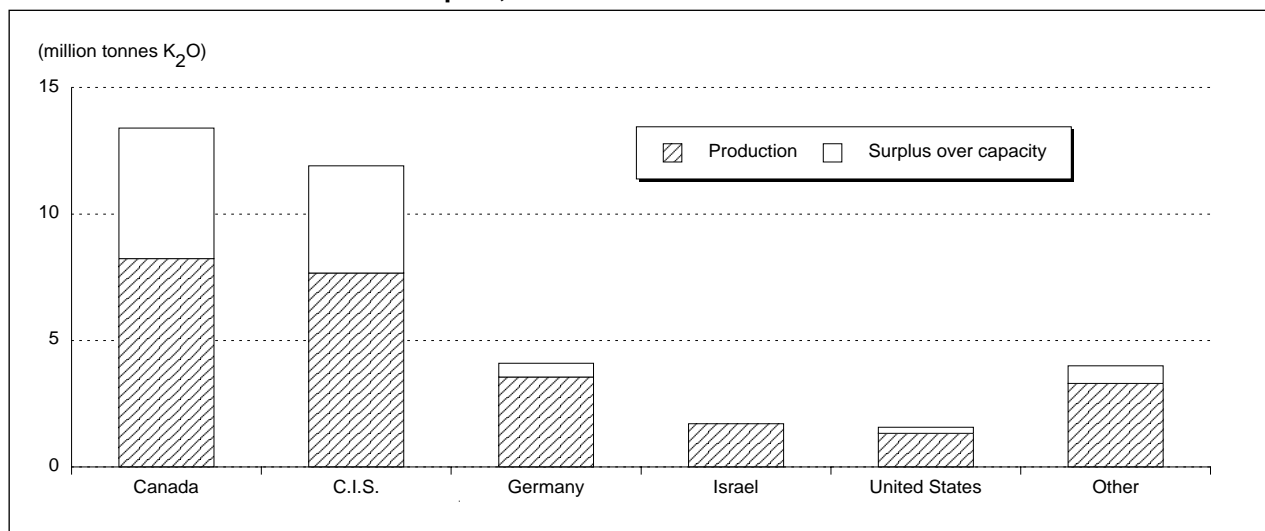
World potash trade in 1999 rose to 19.8 Mt  $K_2O$ , a 0.6-Mt increase, of which Russia and Canada contributed 73% and 7%, respectively, to the increase. Offshore trade, accounting for 48% of total sales in 1999, was up 5% from the 1998 level.

## World Potash Production

World potash production in 1999 was estimated at 25.8 Mt  $K_2O$ , a marginal decrease compared to the previous year. Production increases were recorded in the C.I.S. and Jordan, while significant decreases occurred in Canada, France and the United Kingdom. Globally, potash producers operated at an overall capacity rate of 70% in 1999 compared to 71% in 1998. Canadian operations ran at 61% of capacity and those in the C.I.S. ran at 64%, while all other major world producers operated at levels above 80%, with the exception of Chile (56%) and Spain (72%).

World capacity rose from 36.5 to 36.7 Mt/y  $K_2O$  with the expansion of capacity in Germany, the United States and Chile, while capacity reduction continued in France. Natural Resources Canada estimated in 1999 that the world's potash production capability remained steady at 30 Mt/y  $K_2O$ . The global surplus of capacity over production in 1999 was estimated at close to 11 Mt  $K_2O$ , of which Canada and the C.I.S. contributed 90%.

**Figure 2**  
World Potash Production and Surplus, 1999



Source: Natural Resources Canada.

## CANADIAN INDUSTRY

By year-end 1999, the potash industry in Canada comprised three companies that together employed more than 3400 workers. Production occurred at eight underground mines and two solution mining operations in Saskatchewan and at one underground mine in New Brunswick. Another operation in New Brunswick only used its compaction units after its underground mine flooded in 1997. The Canadian potash industry was first developed in the early 1960s with the opening of potassium chloride mines in Saskatchewan. As the result of a series of expansions in the 1970s and 1980s, Canada now ranks as the world's largest producer and exporter of potash.

### Major Developments

In 1999, Canadian potash production decreased by 10% to 13.6 Mt KCl; Saskatchewan produced about 95% of total Canadian output. The Canadian potash industry operated at 61% of capacity, compared to 69% in 1998. Canadian potash shipments declined by 6% to 13.7 Mt KCl due to weaker sales to U.S. markets. Canada's value of total potash sales (f.o.b. mines) was estimated at \$1.8 billion in 1999, compared to \$1.7 billion in 1998. Canadian inventories decreased by 0.3 Mt to reach 2.3 Mt KCl.

Canada is the world's largest potash exporter with a 40% share of international trade. The C.I.S. is the second largest exporter (30%), followed by Germany (15%). Canada exports potash to more than 40 countries, although only 6 countries account for close to 80% of Canada's total potash exports. In 1999, Canadian potash was shipped mostly to the United States (55%) and Asia (30%), with the remainder being sent to Latin America (10%), Oceania (3%) and Europe (2%).

Canadian potash exports to almost every region, with the exception of Asia, decreased marginally. Data compiled by Statistics Canada indicated that Canadian potash exports were valued at \$2.1 billion. The United States was the dominant destination for Canadian potash; in 1999, sales to the U.S. declined by 2%. In offshore markets, sales rose by 4%. Sales to China decreased by 6% but this country still accounted for 26% of all offshore potash exports from Canada. In Asia, higher exports were reported to India, Indonesia and South Korea. Shipments to Latin America decreased by 8% in 1999; Brazil, which accounted for 73% of Canadian sales in this region, registered a 15% decrease. Sales to Europe dropped by 5% due to lower shipments to France and Belgium. Exports to Oceania declined for the second consecutive year with lower sales to New Zealand and Australia.

The major events in the Canadian potash industry during 1999 included the water inflow situation in

the underground potash mine at PCS New Brunswick Division and the continuation of incremental expansions at some Saskatchewan potash operations. In mid-1999, the U.S. International Trade Commission issued a termination notice for the anti-dumping suspension agreement against Canadian potash producers that had been in place since 1988; the termination took effect on January 1, 2000.

In 1999, Canada's potash capacity was estimated at 22 Mt KCl (13.4 Mt  $K_2O$ ), of which about 2.5 Mt KCl consisted of idle milling units at the Cory, Lanigan and Patience Lake operations in Saskatchewan. Given that capacity figures are based on milling, Canada's potash capability was estimated at 17.2 Mt KCl (10.5 Mt  $K_2O$ ).

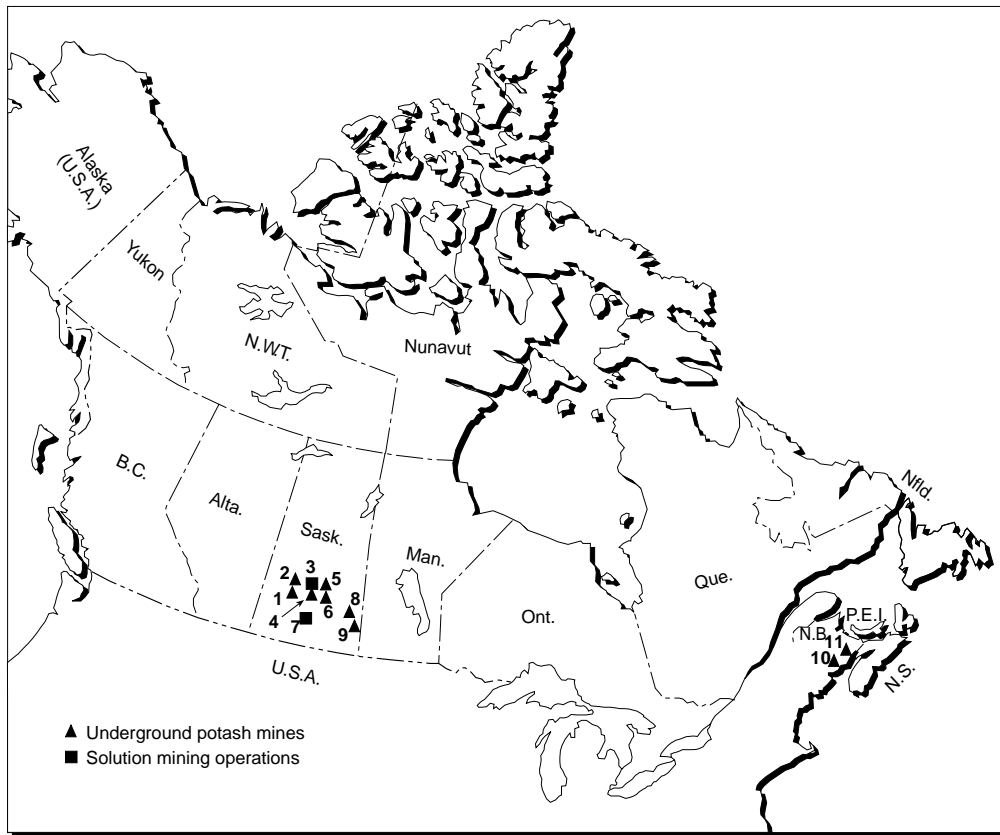
### Saskatchewan

Saskatchewan produced about 95% of total Canadian output in 1999. During the year, several temporary shut-downs were carried out by mine operators in the province for inventory control and, to a lesser extent, for maintenance and vacation. Saskatchewan's potash industry ranks as the world's most productive. Its productivity is more than 10 times that of the Russian industry, and 3 times more than that of the European potash producers. The Saskatchewan potash industry accounts for 33% of world production and 33% of world capacity.

Potash Corporation of Saskatchewan Inc. (PCS), based in Saskatoon, is the largest publicly held potash producer in the world, holding 22% of the world's capacity. PCS operates five mines in Saskatchewan plus one underground mine/mill operation in Sussex and another mill close to Sussex in New Brunswick. PCS also owns reserves at Esterhazy that are mined by International Minerals & Chemical Corporation (Canada) Global Limited (IMC Kalium) under a long-term agreement that entitles PCS to 25% of production. All PCS mines, except for the Patience Lake solution mine, use conventional underground mining techniques. In 1999, potash production from all of PCS's operations, including tonnage from the New Brunswick Division and from PCS's account at Esterhazy, was estimated at 6.3 Mt KCl, a 9% decrease compared to 1998; PCS's milling operating rate was 47%. Throughout 1999, PCS continued to pursue its policy of strict inventory control with intermittent shut-downs at all of its operations. PCS's production milling capacity is estimated at 13.4 Mt KCl (or 8.2 Mt/y  $K_2O$ ), equating to 61% of Canada's total potash capacity. In 1999, the company acquired the assets of Minera Yolanda's potassium nitrate operation in Chile, which has a designed capacity of 360 000 t/y  $KNO_3$ .

IMC Kalium, a division of IMC Global Inc., manages four potash operations in Canada: the two interconnected underground mines, K1 and K2, at

**Figure 3**  
**Location of Potash Mines and Operations in Canada, 1999**



Numbers refer to locations on map above.

**UNDERGROUND POTASH MINES**

1. Agrium Inc., Vanscoy, Saskatchewan
2. Potash Corporation of Saskatchewan Inc., Cory Division, Saskatoon, Saskatchewan
4. Potash Corporation of Saskatchewan Inc., Allan Division, Allan, Saskatchewan
5. IMC Central Canada Potash Inc., Colonsay, Saskatchewan (IMC Kalium)
6. Potash Corporation of Saskatchewan Inc., Lanigan Division, Lanigan, Saskatchewan
8. International Minerals & Chemical Corporation (Canada) Global Limited (K1 and K2 mines), Esterhazy, Saskatchewan (IMC Kalium)
9. Potash Corporation of Saskatchewan Inc., Rocanville Division, Rocanville, Saskatchewan
10. Potash Corporation of Saskatchewan Inc., Cassidy Lake Division, Clover Hill, New Brunswick (milling facilities only)
11. Potash Corporation of Saskatchewan Inc., New Brunswick Division, Sussex, New Brunswick

**SOLUTION MINING OPERATIONS**

3. Potash Corporation of Saskatchewan Inc., Patience Lake Division, Patience Lake, Saskatchewan
7. IMC Kalium Canada Limited, Belle-Plaine, Saskatchewan (IMC Kalium)

Esterhazy in southeastern Saskatchewan; one large potash solution mine at Belle-Plaine, west of Regina; and a conventional underground mine located at Viscount/Colonsay in the Saskatoon area. Altogether, IMC Kalium's Canadian potash capacity is estimated at 6.7 Mt KCl (or 4.1 Mt/y  $K_2O$ ), or 31% of Canada's total potash capacity (and 11% of the world's). In 1999, IMC Kalium's production was estimated at 5.8 Mt KCl and its overall operating rate was 87%. During the year, IMC Kalium continued its structural consolidation program at the Esterhazy mines in Saskatchewan to reduce water inflows that have been occurring for the past 10 years with the objective of cutting the inflow rate to its minimum by 2000. The company pursued its expansion program at Belle-Plaine for completion in 2004 but postponed the expansion plan at Colonsay beyond 2005 due to the prevailing global oversupply.

Agrium Inc., based in Calgary, holds 8% of Canada's potash capacity (3% of the world's) and operates one mine in Vanscoy, Saskatchewan, with a capacity estimated at 1.8 Mt KCl (or 1.1 Mt/y  $K_2O$ ). In 1999, Agrium produced close to 1.5 Mt KCl and operated at 83% of capacity (89% in 1998).

Big Quill Resources Inc. manufactured potassium sulphate from sodium sulphate brine at Big Quill Lake and from purchased potassium chloride. It operated an ion exchange 10 000-t/y unit and commissioned a 40 000-t/y unit using the glaserite process in mid-1999. Big Quill indicated plans for a potential expansion to 300 000 t/y in the future. Potassium sulphate products are used in the fertilizer, chemical and wallboard sectors.

## New Brunswick

In New Brunswick, potash was mined at one underground operation located in the Sussex area of Kings County. Another operation, Potacan Mining Company, which was located 20 km southeast of Sussex, was flooded late in 1997 after operating for 12 years. Potash products for export are hauled 60-80 km from the Sussex area to the Barrack Point potash terminal in Saint John. The terminal has a storage capacity of 165 000 t of potash. The shipping port, equipped with a 2700-t/h ship-loading facility, can accommodate cargo sizes between 3000 and 50 000 t.

The New Brunswick Division of PCS operated the Penobscis underground mine located about 5 km east of Sussex. The operation continued to experience minor water inflows in the underground mine in Sussex; however, the brine inflows did not affect mining operations and were controlled at rates below 400 gallons per minute throughout 1999. Mining is carried out by cut-and-fill methods, along with the use of a room-and-pillar layout. Salt tailings, slimes and excess brine are stored underground as part of an integrated closed-loop mining system. The com-

pany used its PCS Cassidy Lake Division in Penobscis (the former Potacan operation) as a milling facility to upgrade standard-grade potash products from Rocanville, Saskatchewan.

## Manitoba

In 1999, both parties involved in the Manitoba Potash Corporation, a joint venture between Entreprise minière et chimique of France and the Government of Manitoba, assessed different options regarding their respective share in the project. The joint venture holds the rights to a sylvinitic deposit in the Russell-Binscarth area adjacent to the Manitoba-Saskatchewan border. Proven mineable ore reserves were estimated at 120 Mt of potash grading 24.5%  $K_2O$ . Initial development plans in the 1980s called for a 2-Mt/y potassium chloride mine.

## INTERNATIONAL DEVELOPMENTS

In 1999, world production of potash was adjusted to meet a relatively stable demand and several producers reverted to temporary shut-downs to maintain inventory at an adequate workable level. World production was about the same as in 1998 at close to 25.8 Mt  $K_2O$ . Production decreases in Canada, the United Kingdom and France were almost totally offset by significant increases in the C.I.S. and Jordan. North America was the major producing region with a 37% share of world potash output; Canada contributed 32% to world production in 1999 followed by the C.I.S. (30% share), Western Europe (19%) and the Middle East (11%).

## Americas

In Brazil, the potash mine in Vassouras (in Sergipe State), operated by Companhia Vale do Rio Doce (CVRD), increased its output by 40% in four years, reaching close to 540 000 t KCl in 1999. CVRD has a nameplate capacity of 600 000 t/y, but plans to complete a capacity expansion to 700 000 t/y KCl by 2001 with investments in additional ventilation systems and mining equipment.

In Chile, potash production rose by 13% over 1998. SQM Salar S.A., a subsidiary of Sociedad Química y Minera de Chile S.A., completed the third phase of its Minsal project at Salar de Atacama with the completion of the boric acid and potassium sulphate plants, the latter with a capacity of 250 000 t/y  $K_2SO_4$ . In 1999, SQM and Norsk Hydro announced a joint project for a new 100 000-150 000-t/y potassium nitrate plant to be constructed in northern Chile.

In the United States, potash production remained stable in 1999 and the industry operated at 83% of capacity. In early 2000, PCS sold its Moab Salt Inc.

subsidiary in Utah to Intrepid Oil & Gas Inc. Under the agreement with Intrepid, PCS will continue to market the potash produced at the Moab operation, which is a solution potash and salt mine. Mississippi Chemical Corporation completed an expansion at its Mississippi Potash West facility in Carlsbad to reach a capacity of close to 0.5 Mt/y KCl. IMC Kalium completed the construction of a new US\$77 million potassium-magnesium potash processing facility in Carlsbad; capacity is expected to increase by 50% to reach 1.3 Mt KCl by 2005. IMC Kalium also has plans for a 40% expansion at its potassium sulphate operation at Odgen for capacity to reach 620 000 t/y  $K_2SO_4$  in 2003.

### C.I.S.

Potash production in the C.I.S. in 1999 increased for the fourth consecutive year and reached 12.7 Mt KCl. The annual operating rate was in excess of 64% of capacity, compared with 58% in 1998. Russia's potash production rose 17% to reach 6.7 Mt KCl with an overall operating rate of 63%; its potash was produced by Uralkali Ltd. and Sylvinit Ltd. In Belarus, potash production rose 5% to 6 Mt KCl; PO Belaruskali operated at 66% of capacity, its highest level during the past eight years. C.I.S. potash deliveries totaled 12 Mt KCl, an 11% increase due to sustained offshore sales. Domestic deliveries remained stable at 2.3 Mt KCl in 1999; Russia delivered 51% of domestic sales. In 1999, Kama Ltd., which is a subsidiary of Uralkali JSC, started a new secondary potassium sulphate plant at Berezniki III with an initial capacity of 100 000 t/y  $K_2SO_4$ ; this capacity could be doubled in the future. Russian output of carnallite concentrate was estimated at close to 500 000 t in 1999, up 13% over 1998. In April 1999, the Government of Russia implemented a temporary 5% export tax for mineral and chemical fertilizers, a tariff that was extended beyond October's initial termination date. During the second half of 1999, Fedcominvest (FCI) started to trade potash on behalf of Uralkali with reported sales to India, Bangladesh and China. Shipments were reportedly made from the Black Sea Port of Ilichevsk.

In 1999, total C.I.S. exports increased by 11% to 9.7 Mt KCl. Exports rose mostly in Asia, with some declines registered in North America and Latin America. Major export destinations were China (3 Mt KCl), followed by India (1.6 Mt), Brazil (1 Mt) and Central Europe (0.7 Mt). Exports were shipped mostly from the Port of Ventspils (Latvia) and partly from the Russian Port of St. Petersburg, the Ukrainian ports of Ilyichevsk and Nikolaev on the Black Sea, and the Port of Klaipeda (Lithuania). An important level of shipments was also moved by rail to the Far East Port of Vostochny for delivery in Southeast Asia. Several terminal facilities are being expanded for additional storage at numerous ports (Ventspils, Nikolaev and Vostochny).

### Europe

In France, potash production continued to decrease for the seventh consecutive year as a result of the phase-out of potash mining in Alsace; French production in 1999 declined by over 25%. According to the Société Commerciale des Potasses et de l'Azote, the two remaining operating shafts, Berwiller at Marie-Louise Ouest and Amélie 1 at Amélie, will close in 2002 and 2004, respectively. In 1999, the crystallization units at Marie-Louise, which produced white technical grades, were shut down and all potash ore was to be processed at the remaining flotation plant at Amélie. In Germany, potash production remained steady. Kali und Salz reported the completion of a series of development projects at several of its mines, including an expansion at Zielitz and Unterbreizbach. Total potash capacity in Germany increased by 11% to reach 4.1 Mt  $K_2O$ . In Spain, production rose 10% as potash was extracted from two mines at Llobregat and Suria in Catalonia. The mines operated under the group Iberpotash, owned by Dead Sea Works Ltd. (DSW) of Israel and two Spanish companies. In the United Kingdom, Cleveland Potash Ltd.'s output declined by 20% due to water inflows that occurred in a conveyor roadway leading to a production stope in the southern part of the mine. Potash production panels were unaffected; additional pumping and piping capacity was installed and full operation resumed in the fourth quarter of 1999.

### Middle East

In Israel, DSW's production rose 2% in 1999 to reach its capacity of 2.8 Mt KCl. The company announced a US\$90 million plan to expand its potash operation at Sedom, including new equipment for industrial-grade potash products and compaction units for granular potash grades. Haifa Chemicals Ltd. completed an expansion at its potassium nitrate plant near Mishor Rotem, doubling the capacity to 200 000 t/y  $KNO_3$ .

In Jordan, potash production by the Arab Potash Co. Ltd. (APC) increased for a second consecutive year and reached a record level of 1.8 Mt KCl, equating to an operating rate of close to 100%. APC continued to work on its expansion program at Safi to increase capacity by 20% to 2.2 Mt/y KCl in 2002; a second phase is also being contemplated for another 200 000 t/y KCl by 2004. A 2-km section of a newly constructed 11-km earth dike collapsed at APC's solar evaporation production facilities in Safi in March 2000; the collapse did not affect potash production as the new pond is part of a current expansion project that is scheduled for completion during 2002. In 1999, APC finalized a joint agreement with Kemira Agro of Finland for a US\$94 million potassium nitrate plant with a capacity of 150 000 t/y  $KNO_3$  to be completed by 2002 in Aqaba. Plans for a new 120 000-t/y granulation unit are being reassessed. APC also announced plans for the construction of a new,

industrial, two-berth jetty at Aqaba to increase the terminal's handling capacity of fertilizers, including potash.

## Asia

In China, potash production was estimated at more than 250 000 t  $K_2O$ . Spur Ventures Inc. of Vancouver announced a new joint venture between its wholly owned subsidiary, Kunlun Potash Ltd., and Golmud Potash Corporation for increasing potash capacity and output at Golmud and producing potassium sulphate in the medium term. The specialized press reported that two small sylvinitic mines have been in operation in Yunnan and Shandong with a total capacity of less than 300 000 t/y KCl. Current potash projects include the construction of a 200 000-t/y KCl plant at Qinghai and a further postponement of the Sino-Israeli Qinghai Potash Corporation joint venture, which has been planning a solar potash project at Qarhan Salt Lake with a capacity of 800 000 t/y KCl for the past 10 years. In recent years, China is reported to have increased its production of potassium sulphate with the commissioning of several small plants in the provinces of Yunnan, Shanxi, Sichuan, Hubei and Jiangsu. Potassium sulphate production was estimated to exceed 200 000 t  $K_2SO_4$ .

In northeastern Thailand, the ASEAN Potash Mining Co. (APMC) continued development work at its salt-potash operation at Bamnet Narong. The US\$590 million project is for an underground mine with a capacity of about 1.1 Mt/y KCl. The construction of a 933-m-long decline to the 180-m level was completed late in 1997. Since 1998, APMC has extracted a total of 100 000 t of salt and 120 000 t of carnallite ore grading 12%  $K_2O$ . Some carnallite was used for the pilot tests, while most of the volume was stored in a lined and covered pond. APMC expects to complete the processing plant's basic engineering design and pilot tests in mid-2000 and to award the contract for detail engineering construction design for the processing plant and infrastructure by the end of 2000. The company plans to produce 0.5 Mt/y of salt and to start potash mining by 2004.

Also in northern Thailand, Asia Pacific Potash Corporation (APPC) completed a bankable feasibility study in 1998 for the development of a sylvinitic potash deposit in the Sakon Nakhon Basin close to the Laos border. The company has been investigating two orebodies: the Somboon and Udon fields. The development of the first 2-Mt/y potassium chloride mine is currently centred around Somboon where mineable reserves have been estimated at 180 Mt of sylvinitic ore grading 23%  $K_2O$ . In 1999, APPC signed two agreements with Norsk Hydro ASA of Norway, which is the world's largest finished fertilizer producer, and

with an affiliate of Bechtel Enterprises Holdings Inc., the American-based construction company that will oversee construction of the mine. Both companies have expressed interest in a 20% share in the Somboon potash project. Norsk Hydro will distribute 75% of APPC's product. APPC has estimated that the total cost of the projects will reach US\$600 million, of which US\$454 million is assigned to direct mine-site costs. A decision to start construction is expected in 2000 for completion in 2004. Of the 2 Mt of expected potash output, close to 0.4 Mt will be dedicated to the domestic market and the remaining 1.6 Mt will be exported to other countries in Southeast Asia.

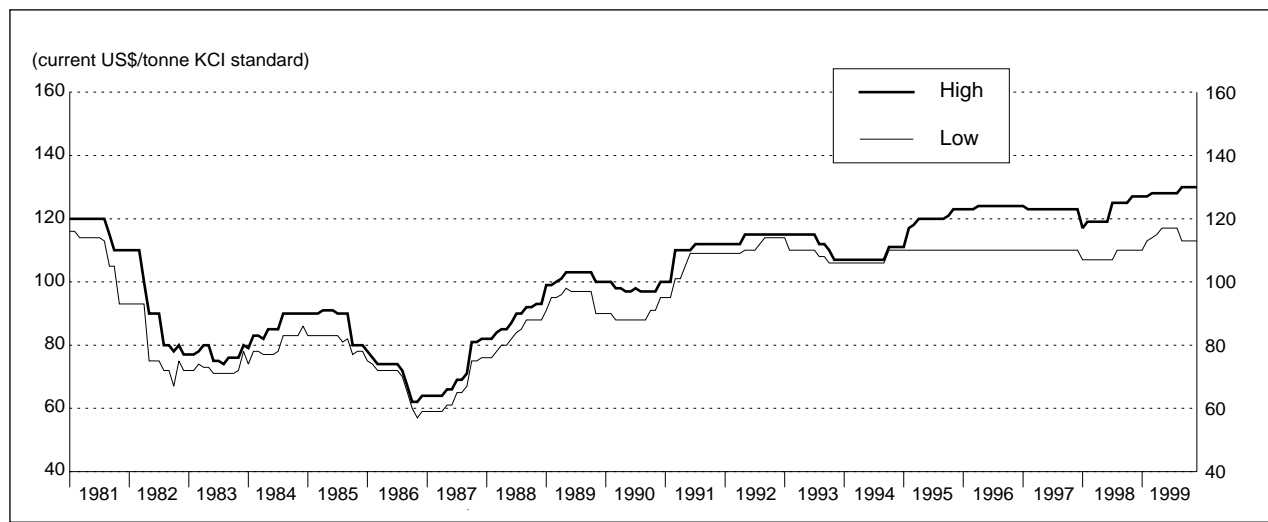
## PRICES

The price of potash quoted on a free on board (f.o.b.) Vancouver basis (in U.S. dollars) is considered to be the pricing indicator for most Canadian international offshore sales. In many markets, prices are also quoted on a delivered basis, CFR (cost and freight) and c.i.f. (cost, insurance and freight) foreign ports. Canpotex Limited, representing all Saskatchewan potash producers, sells both f.o.b. Vancouver or c.i.f. foreign ports, or out of warehouses in Asia.

Entering 1999, f.o.b. Vancouver potash prices were quoted at an average of US\$118/t KCl for standard grade. During the first three quarters of 1999, offshore potash price quotations were firm, rising by an overall 2% and then remaining flat in the fourth quarter. By the end of the year, price quotations were relatively steady at an average of US\$121/t for standard grade KCl f.o.b. Vancouver. In other offshore business, C.I.S. potash prices were quoted at US\$95-\$105/t for standard potash f.o.b. Baltic ports in early 1999, and moved up in the early spring to reach US\$98-\$110/t, a level that remained unchanged for the rest of the year, equating to an average 4% increase for the entire year.

In North America, quotations f.o.b. Midwest on coarse-grade potash started at US\$120-\$124/short ton (st) in January 1999. In the first half of the year, price quotations demonstrated some upwardly fluctuations and varied between US\$116 and \$128/st. During the second half of the year, after a seasonal correction during the summer, quotations decreased in the third quarter and ended the year at US\$113-\$122/st, prompting buyers to benefit from the suppliers' winter fill price incentives. On average, potash prices in the United States decreased 3.5% over 1998. The gap between the low and high price quotations tended to increase by year-end, signalling some upward movement for the first half of 2000.

**Figure 4**  
**Canada, Offshore Potash Price Quotations, 1981-99**  
 f.o.b. Vancouver Contract



Source: Compiled by Natural Resources Canada from trade magazines and specialized subscriptions.

## OUTLOOK

### World Potash Demand

In 2000, offshore potash sales are expected to be solid due to favourable developments for potash consumption in Asia and Latin America, most notably in China, India, Indonesia, Vietnam, Malaysia and Brazil. Global demand will likely remain steady with increased requirements in key markets such as Brazil, China and India offsetting reduced demand in the C.I.S. and Europe. The economic and welfare growth in developing nations will continue to generate a demand for improved agricultural products to meet the needs of a growing population looking for an enhanced high-protein diet; this will be achieved through better farming practices, new hybrid crops, and improved, balanced fertilization.

In Europe, fertilizer demand will be affected by the agricultural policy of the European Union, *Agenda 2000*, which was passed in March 1999. In the European Union, long-term demand for fertilizer is forecast to decline due to improved land management and more efficient fertilizer usage. By 2008, potash nutrient consumption is projected to be less than 4.0 Mt K<sub>2</sub>O. In Central Europe, increased fertilizer use is expected to accompany significant agricultural development and the rebuilding of soil fertility in several countries. In the C.I.S., agricultural development continues to be closely linked to land access and ownership, availability of credits, and government support for reforms. Over the next 10 years, potash consumption is forecast to recover slowly to 2.5 Mt/y K<sub>2</sub>O by 2008.

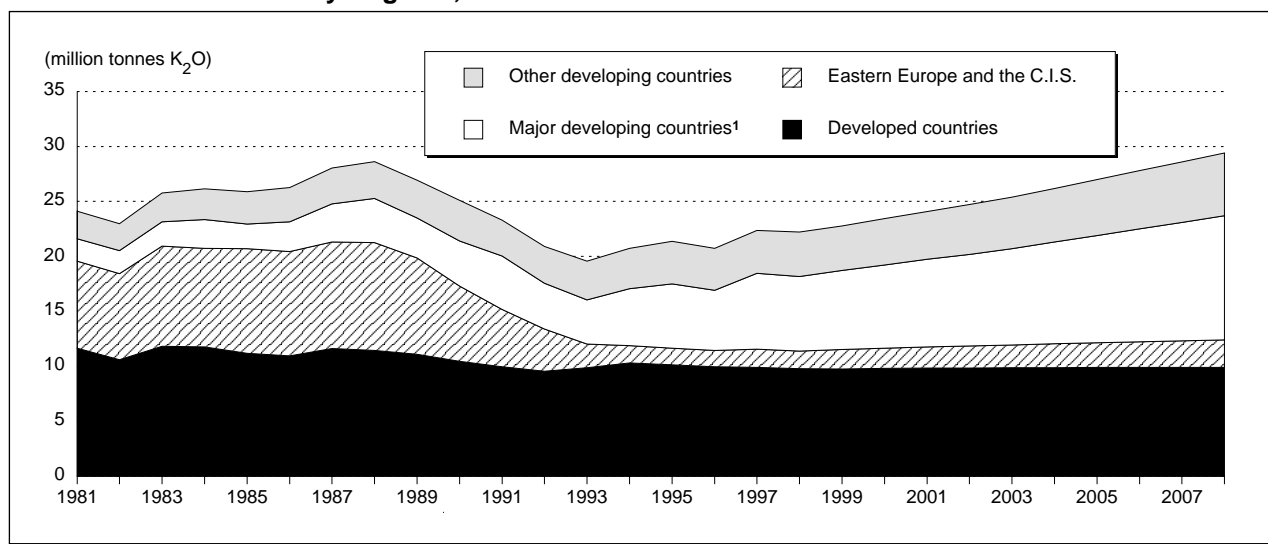
In Asia, the need to improve crop yield in India will translate into higher demand for fertilizers, which may triple over the next 20 years. In the long term, potash demand in India has the potential to reach 2.2 Mt/y to meet its need for correcting the resilient nutrient imbalance in the nitrogen-to-potash ratio (1:0.12 compared to an optimal ratio of 1:0.25). In China, the nitrogen-to-potash ratio has continued to improve, increasing from 1:0.04 in 1980 to 1:0.18 in 1998. This increase was instrumental in resulting in higher yields. However, the optimum ratio is estimated at 1:0.30. More than 70% of China's arable land is considered to be potash deficient, and close to 30% is extremely deficient. Total Chinese demand could exceed 5.5 Mt/y K<sub>2</sub>O by 2008.

In Latin America, potash consumption accounts for 12% of global demand and has shown a significant 45% increase over the past five years. By 2008, Latin America will account for 15% of world potash demand, with consumption expected to be close to 4.5 Mt/y K<sub>2</sub>O. Brazil's Cerrados region, which extends more than 2 million km<sup>2</sup> (one of the world's largest agricultural land areas yet to be used) offers the potential for a significant increase in fertilizer usage. In the long term, opportunities for increasing potash use in Brazil to improve the potassium application rate in basic food crops such as corn will push demand to more than 3.5 Mt/y K<sub>2</sub>O by 2008. In the United States, the potash application rate is expected to remain relatively steady and to reach 5.0 Mt/y K<sub>2</sub>O by 2008.

Total world demand for potash in 2000 is projected at 26 Mt K<sub>2</sub>O, including 23.4 Mt for fertilizer potash,



**Figure 5**  
**World Potash Demand by Regions, 1981-2008**



Source: Natural Resources Canada.

<sup>1</sup> Includes China, Brazil and India.

2.2 Mt for industrial uses, and about 0.4 Mt as a distribution gap. In the long term, world demand for fertilizer potash is expected to continue to expand and grow at an annual rate of 2% to reach 29.5 Mt/y K<sub>2</sub>O by 2008. Most of the increase in this 10-year period will be registered in Asia (65%) followed by the Americas (25%) and the C.I.S. and Central Europe (10%). World demand for industrial potash is projected at 2.5 Mt/y K<sub>2</sub>O by 2008. Taking into account growing industrial uses and fertilizer consumption, as well as the distribution gap, total world demand for potash is forecast at close to 32.5 Mt/y K<sub>2</sub>O by 2008, compared to 25.8 Mt in 1999. Growth in developed countries will be marginal, while Central Europe and the C.I.S. are expected to register some recovery and account for 10% of world fertilizer potash demand by 2008. Most of the growth in potash consumption will come from developing countries, which will account for 55% of world demand for fertilizer potash.

## World Potash Supply

On the supply side, potash capacity from established producers continues to increase through incremental expansions at existing operations. The capacity from current producers is estimated at around 37.8 Mt/y K<sub>2</sub>O in 2008, compared to 36.7 Mt/y in 1999. Established producers have been announcing expansions in Canada, the United States, Chile, Brazil, Israel and Jordan for a wide range of potassium products, including potassium chloride, potassium sulphate and potassium nitrate. From their perspective, the

marginal cost of expanding capacity is far more favourable than the unit cost associated with the opening of new mines.

In the last decade, the projected strong demand for potash and its potential for growth in developing countries have led to numerous projects promoting green-field potash mines in regions close to the growing markets. While many prospects were being announced, only few have emerged as financially attractive and technically feasible. Projects in Asia (China and Thailand), which were initially deemed for commissioning in the late 1990s, are now slated for possible production by 2005; these projects are estimated to have a medium to high level of probability of occurrence and would add close to 2.4 Mt/y K<sub>2</sub>O of new capacity. Other developments are being assessed as more tentative (in Argentina, the Congo, Ethiopia, Manitoba and Oman) and would, if realized, add an additional 1.6 Mt/y K<sub>2</sub>O to world capacity after 2006.

The global potash capacity has the potential to increase by an overall 10% to 40.2 Mt/y in 2008, of which two thirds may come from new projects in emerging economies (excluding the tentative projects). For the next 10 years, the world's potash supply/demand balance is forecast to face a declining surplus. Based on capacity projections and demand forecasts, this surplus is expected to decline very gradually from about 11 Mt K<sub>2</sub>O in 1999 to 8 Mt/y by 2008. The surplus will be distributed among several producers, including those in Canada and the C.I.S.

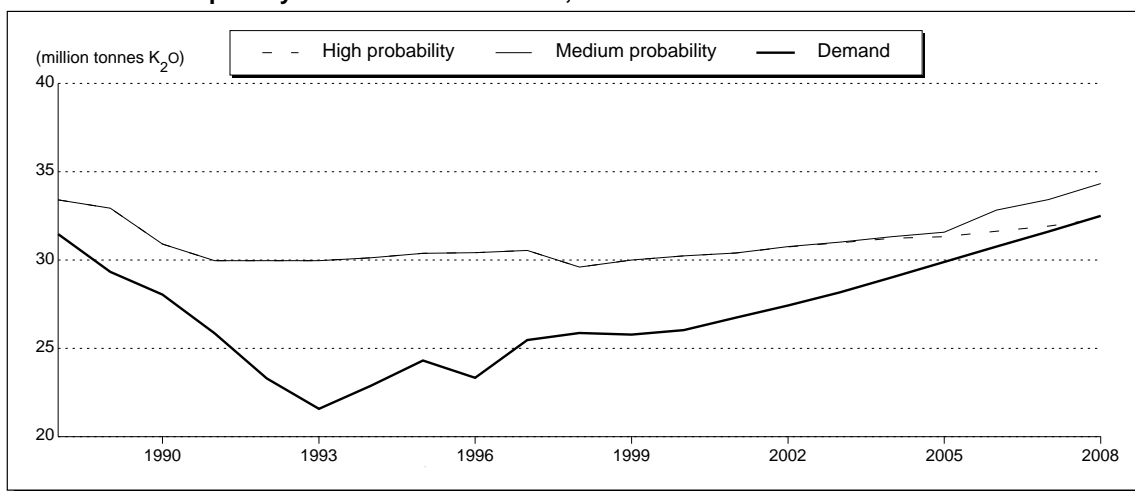
A better measure of the world's potash balance is obtained with the concept of capability (which refers to achievable marketable production capacity when considering technical and logistical constraints). World production capability for 1999 was estimated by Natural Resources Canada at around 30 Mt K<sub>2</sub>O for a marketable production surplus over demand of about 4.2 Mt K<sub>2</sub>O. By 2008, the world's potash capability, including new projects with a medium to high probability of occurrence, is projected at about 34.4 Mt/y, leading to a marketable production surplus of 1.8 Mt/y K<sub>2</sub>O. The surplus ratio of capability to demand would be reduced from the current level of 16% down to 6% in 2008.

*Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 65. (2) Information in this review was current as of April 30, 2000. (3) This and other reviews, including previous editions, are available on the Internet at [http://www.nrcan.gc.ca/nms/cmj/index\\_e.html](http://www.nrcan.gc.ca/nms/cmj/index_e.html).*

## NOTE TO READERS

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**Figure 6**  
**World Potash Capability Scenarios and Demand, 1988-2008**



Source: Natural Resources Canada.

## TARIFFS

Item No.	Description	Canada			United States
		MFN	GPT	USA	Canada
3104.20	Potassium chloride	Free	Free	Free	Free
3104.30	Potassium sulphate	Free	Free	Free	Free
3104.90.00.10	Magnesium-potassium sulphate	Free	Free	Free	Free
3104.90.00.90	Other	Free	Free	Free	Free

Sources: Customs Tariff, effective January 2000, Canada Customs and Revenue Agency; Harmonized Tariff Schedule of the United States. 2000.

TABLE 1. CANADA, POTASH PRODUCTION, SHIPMENTS AND TRADE, 1998 AND 1999

Item No.	1998		1999p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
<b>PRODUCTION, Potassium Chloride</b>					
Gross weight	15 051 362	..	13 605 681	..	
K <sub>2</sub> O equivalent	9 201 458	..	8 329 422	..	
<b>SHIPMENTS</b>					
K <sub>2</sub> O equivalent	8 883 616	1 747 985	8 345 007	1 775 833	
<b>IMPORTS, Fertilizer Potash</b>					
3104.20	Potassium chloride, in packages weighing more than 10 kg				
	United States	4 416	608	3 791	527
	France	402	55	333	48
	Canada	-	-	67	8
	Germany	4	1	35	4
	United Kingdom	29	5	9	2
	Spain	1	2	17	1
	Switzerland	2	..	3	..
	Norway	-	-	1	..
	Total	4 854	671	4 256	590
3104.30	Potassium sulphate, in packages weighing more than 10 kg				
	United States	7 607	2 274	374	219
	Belgium	231	116	209	121
	Japan	2	2	5	6
	United Kingdom	6	6	4	5
	Germany	3	4	1	1
	Canada	..	1	-	-
	Russia	869	988	-	-
	Total	8 718	3 391	593	352
3104.90.00.10	Magnesium-potassium sulphate				
	United States	69 765	14 458	64 135	11 146
	Total	69 765	14 458	64 135	11 146
3104.90.00.90	Other potassic fertilizer				
	United States	8 275	2 623	9 683	3 394
	Israel	188	96	767	290
	United Kingdom	-	-	192	81
	Chile	185	108	112	68
	Norway	-	-	80	45
	New Zealand	2	1	43	29
	Mexico	19	15	19	15
	Netherlands	-	-	9	6
	China	203	98	-	-
	Italy	12	4	-	-
	Total	8 884	2 945	10 905	3 928
Potash Chemicals					
2815.20	Potassium hydroxide (caustic potash)	18 855	11 177	19 554	11 487
2834.21	Potassium nitrate	7 912	4 673	9 029	5 192
2835.24	Potassium phosphates	1 477	1 706	1 846	2 148
2836.40	Potassium carbonates	2 551	1 855	2 738	1 812
2839.20	Potassium silicates	1 149	585	887	534
	Total potash chemicals	31 944	19 996	34 054	21 173
<b>EXPORTS, Fertilizer Potash<sup>1</sup></b>					
3104.20	Potassium chloride, in packages weighing more than 10 kg				
	United States	8 546 315	1 125 230	8 452 844	1 123 581
	China	1 729 553	257 394	1 747 555	296 200
	Brazil	1 008 034	144 869	870 390	129 114
	Japan	459 453	69 604	442 789	84 228
	Malaysia	514 758	77 066	442 456	74 672
	South Korea	296 385	44 421	416 165	70 307
	Australia	299 945	45 068	273 958	46 656
	India	49 737	7 775	240 459	41 029
	Indonesia	51 216	8 065	166 552	28 279
	Taiwan	196 379	29 584	159 495	26 676
	Thailand	188 254	28 346	151 786	25 919
	New Zealand	177 097	26 883	147 453	24 893

**TABLE 1 (cont'd)**

Item No.	1998		1999P	
	(tonnes)	(\$000)	(tonnes)	(\$000)
<b>EXPORTS (cont'd)</b>				
Belgium	98 297	14 809	117 610	18 807
Italy	119 445	18 282	78 659	13 429
Vietnam	91 785	13 932	71 772	12 013
Spain	97 165	12 192	81 433	11 155
Guatemala	53 510	7 898	59 677	10 029
Philippines	43 518	6 596	59 345	9 939
Chile	40 036	6 046	54 392	9 071
Cuba	25 600	3 210	70 500	8 638
Costa Rica	—	—	37 390	6 248
France	14 218	1 783	44 864	5 449
Denmark	31 468	3 765	32 263	3 935
Colombia	35 900	5 516	21 383	3 652
Singapore	—	—	15 101	2 572
Mexico	16 955	2 143	11 570	1 965
South Africa	10 155	1 541	10 298	1 750
Dominican Republic	18 600	2 414	12 041	1 637
Ivory Coast	—	—	9 900	1 339
Fiji	5 474	861	4 932	838
Portugal	—	—	6 550	792
Argentina	3 000	470	4 409	757
Pakistan	—	—	108	70
United Kingdom	72	42	108	35
Venezuela	10 500	1 322	—	—
El Salvador	19 600	2 831	—	—
Total	14 252 424	1 969 958	14 316 207	2 095 674
3104.30	Potassium sulphate, in packages weighing more than 10 kg			
United States	10 670	5 439	21 760	9 297
Romania	—	—	21	12
South Korea	17	102	—	—
Australia	166	80	—	—
Total	10 860	5 621	21 781	9 309

Sources: Natural Resources Canada; Statistics Canada.

— Nil; . . Not available or not applicable; . . . Amount too small to be expressed; P Preliminary.

1 Countries are ranked in descending order of value.

Note: Numbers may not add to totals due to rounding.

**TABLE 2. CANADA, POTASH PRODUCTION AND SALES IN 1998, AND BY QUARTER, 1999**

	Total 1998	1999				Total
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
(000 tonnes K <sub>2</sub> O equivalent)						
Production	9 193.4	2 314.7	2 276.8	1 489.6	2 147.9	8 228.8
Sales						
North America	4 777.3	1 258.3	1 268.4	1 040.9	1 103.9	4 671.5
Offshore	3 489.2	926.3	1 127.2	853.1	710.9	3 617.6
Total	8 266.5	2 184.6	2 395.6	1 894.0	1 814.8	8 289.1
Ending inventories						
Mine site	950.7	956.7	1 005.0	508.3	560.4	n.a.
Off site	567.2	595.4	548.2	594.1	816.6	n.a.
Total	1 517.9	1 552.1	1 553.1	1 102.4	1 377.0	n.a.

Source: Potash and Phosphate Institute, 1999.

n.a. Not applicable.

**TABLE 3. CANADA, POTASH INVENTORY, PRODUCTION, DOMESTIC SALES AND EXPORT SALES, 1999**

Month	Beginning Inventory	Production	Domestic Sales			U.S. Sales			North American Sales	Offshore Exports	Total Sales
			Agriculture	Non-Agriculture	Total	Agriculture	Non-Agriculture	Total			
(000 tonnes K <sub>2</sub> O)											
January	1 517.9	647.4	15.1	1.6	16.8	442.9	46.2	489.1	505.8	277.3	783.1
February	1 394.6	793.6	23.2	1.7	24.9	263.3	44.2	307.5	332.4	369.8	702.3
March	1 486.6	873.6	28.1	1.8	29.9	332.8	57.3	390.1	420.0	279.3	699.3
Subtotal, 1st quarter		2 314.7	66.5	5.2	71.6	1 039.0	147.7	1 186.6	1 258.3	926.3	2 184.6
April	1 552.1	813.9	72.7	9.4	82.2	462.0	64.3	526.3	608.5	333.8	942.4
May	1 471.9	857.4	120.1	1.6	121.7	308.7	45.0	353.6	475.4	335.2	810.6
June	1 563.3	605.4	15.1	1.1	16.2	112.9	55.4	168.3	184.6	458.2	642.8
Subtotal, 2nd quarter		2 276.8	208.0	12.2	220.1	883.6	164.7	1 048.3	1 268.4	1 127.2	2 395.7
July	1 553.1	296.6	9.9	0.7	10.6	95.2	41.2	136.4	147.0	377.9	525.0
August	1 295.1	446.2	38.0	3.4	41.4	484.1	44.0	528.1	569.5	223.3	792.8
September	945.4	746.8	16.1	3.6	19.7	261.8	42.9	304.7	324.3	251.9	576.2
Subtotal, 3rd quarter		1 489.6	63.9	7.8	71.7	841.1	128.1	969.1	1 040.9	853.1	1 894.0
October	1 102.4	816.8	25.0	3.8	28.8	354.9	52.4	407.3	436.2	330.0	766.1
November	1 081.9	684.1	16.6	3.0	19.6	339.9	61.4	401.3	420.8	165.7	586.5
December	1 199.6	647.0	11.6	2.4	14.0	182.7	50.2	232.9	246.9	215.2	462.1
Subtotal, 4th quarter		2 147.8	53.2	9.2	62.4	877.4	164.1	1 041.5	1 103.9	710.9	1 814.8
Total		8 228.8	391.6	34.3	425.9	3 641.1	604.5	4 245.6	4 671.5	3 617.6	8 289.1

Source: Potash and Phosphate Institute.

Notes: Reported stocks at year-end totaled 1.377 Mt. Numbers may not add to totals due to rounding.

**TABLE 4. CANADIAN POTASH, CURRENT SITUATION, 1990-99, AND FORECAST, 2000**

	Actual										Forecast <sup>1</sup> 2000 <sup>e</sup>
	1990	1991	1992	1993	1994	1995	1996	1997	1998 <sup>r</sup>	1999 <sup>p</sup>	
(000 tonnes K <sub>2</sub> O)											
Capacity	12 045	12 045	12 180	12 180	12 235	13 220	13 310	13 390	13 400	13 405	13 460
Production	7 002	7 402	7 270	6 850	8 182	9 065	8 042	9 030	9 190	8 230	8 420
Capacity utilization (%)	58	61	60	56	67	69	60	67	69	61	63
Sales	7 190	7 056	7 025	6 863	8 517	8 635	7 970	9 510	8 265	8 290	8 500
of which: Domestic	396	350	370	356	385	345	355	490	450	425	430
United States	3 630	3 610	3 945	4 048	4 560	4 495	4 335	5 295	4 325	4 245	4 300
Offshore	3 164	3 096	2 710	2 459	3 535	3 795	3 280	3 725	3 490	3 620	3 770
Year-end stocks	1 272	1 585	1 785	1 726	1 285	1 545	1 420	935	1 520	1 380	1 300
World production	27 452	26 035	24 036	20 407	22 687	24 302	23 331	25 467	25 870	25 775	25 800
World capacity <sup>2,r</sup>	37 923	37 068	36 594	35 512	35 624	36 299	36 529	36 836	36 490	36 663	36 840
World sales (IFA)	27 590	24 175	23 175	20 835	23 620	23 375	22 490	25 745	24 260	26 655	27 000
World balance <sup>2</sup>	10 333	12 893	13 419	14 677	12 004	12 924	14 039	11 091	12 230	10 008	9 840
Canada/world											
Production ratio (%)	25.5	28.4	30.2	33.6	36.1	37.3	34.5	35.5	35.5	31.9	32.6
Capacity ratio (%)	31.8	32.5	33.3	34.3	34.3	36.4	36.4	36.4	36.7	36.6	36.5

Sources: Natural Resources Canada; Potash and Phosphate Institute.

<sup>e</sup> Estimated; <sup>p</sup> Preliminary; <sup>r</sup> Revised.<sup>1</sup> Forecast by Natural Resources Canada. <sup>2</sup> Estimated by Natural Resources Canada.

TABLE 5. CANADA, POTASH MINES, CAPACITY PROJECTIONS, 1990-2005

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	(000 tonnes K <sub>2</sub> O)															
<b>SASKATCHEWAN</b>																
Agrium Inc. Vade (Vanscoy)	815	815	830	830	830	930	1 020	1 100	1 100	1 100	1 100	1 100	1 100	1 100	1 100	1 100
Central Canada Potash Inc. <sup>1</sup> Colonsay	830	830	830	830	-	-	-	-	-	-	-	-	-	-	-	-
International Minerals and Chemical Corporation <sup>2</sup> K1 and K2, Esterhazy (75%)	1 745	1 745	1 745	1 745	1 745	1 745	-	-	-	-	-	-	-	-	-	-
Kalium Canada, Ltd. <sup>1,2</sup> Belle-Plaine	1 245	1 245	1 245	1 245	1 300	1 410	-	-	-	-	-	-	-	-	-	-
Central Canada Potash Inc., Colonsay	-	-	-	-	830	930	-	-	-	-	-	-	-	-	-	-
Subtotal	1 245	1 245	1 245	1 245	2 130	2 340	-	-	-	-	-	-	-	-	-	-
IMC Kalium <sup>2</sup> K1 and K2, Esterhazy (75%)	-	-	-	-	-	-	1 745	1 745	1 745	1 745	1 745	1 745	1 745	1 745	1 745	1 745
Belle-Plaine	-	-	-	-	-	-	1 410	1 410	1 410	1 415	1 415	1 470	1 470	1 470	1 580	1 800
Central Canada Potash Inc., Colonsay	-	-	-	-	-	-	930	930	930	930	930	930	930	930	930	930
Subtotal	-	-	-	-	-	-	4 085	4 085	4 085	4 090	4 090	4 145	4 145	4 145	4 255	4 475
Potash Company of America <sup>3</sup> Patience Lake	630	630	630	-	-	-	-	-	-	-	-	-	-	-	-	-
Potash Corporation of Saskatchewan Inc. Allan	960	960	960	960	960	1 150	1 150	1 150	1 150	1 150	1 150	1 150	1 150	1 150	1 150	1 150
Cory	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830
Esterhazy (25%)	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580
Lanigan	2 090	2 090	2 090	2 090	2 090	2 335	2 335	2 335	2 335	2 335	2 335	2 335	2 335	2 335	2 335	2 335
Patience Lake	-	-	-	630	630	630	630	630	630	630	630	630	630	630	630	630
Rocanville	1 160	1 160	1 160	1 160	1 160	1 400	1 400	1 400	1 400	1 400	1 400	1 400	1 400	1 400	1 400	1 400
Subtotal	5 620	5 620	5 620	6 250	6 250	6 925	6 925	6 925	6 925	6 925	6 925	6 925	6 925	6 925	6 925	6 925
Total Saskatchewan	10 885	10 885	10 900	10 900	10 955	11 940	12 030	12 110	12 110	12 115	12 115	12 170	12 170	12 170	12 280	12 500
<b>NEW BRUNSWICK</b>																
Potacan Mining Company of Canada <sup>4</sup> Clover Hill (Sussex)	780	780	810	810	810	810	810	810	-	-	-	-	-	-	-	-
Potash Company of America, Inc. <sup>3</sup> Penobsquis (Sussex)	380	380	470	-	-	-	-	-	-	-	-	-	-	-	-	-
Potash Corporation of Saskatchewan Inc. New Brunswick Division (Penobsquis)	-	-	-	470	470	470	470	470	480	480	480	480	480	480	480	480
Cassidy Lake Division (Clover Hill)	-	-	-	-	-	-	-	-	810	810	810	810	810	810	810	810
Subtotal	-	-	-	470	470	470	470	470	1 290	1 290	1 290	1 290	1 290	1 290	1 290	1 290
Total New Brunswick	1 160	1 160	1 280	1 280	1 280	1 280	1 280	1 280	1 290	1 290	1 290	1 290	1 290	1 290	1 290	1 290
Total Canada	12 045	12 045	12 180	12 180	12 235	13 220	13 310	13 390	13 400	13 405	13 460	13 460	13 460	13 460	13 570	13 790

Sources: Natural Resources Canada; company interviews and reports.

- Nil.

<sup>1</sup> Sold to Kalium Chemicals Company Limited in 1994. <sup>2</sup> IMC Global Inc. merged with Kalium Chemicals in 1996. <sup>3</sup> Sold to Potash Corporation of Saskatchewan Inc. in 1993. <sup>4</sup> PMC underground mine was flooded in the fall of 1997; the operation was sold to Potash Corporation of Saskatchewan Inc. in early 1998.

**TABLE 6. WORLD POTASH PRODUCTION, 1993-99**

	1993	1994	1995	1996	1997	1998 <sup>r</sup>	1999 <sup>e</sup>
	(000 tonnes K <sub>2</sub> O)						
Brazil	173	242	223	234	280	327	335
Canada	6 850	8 182	9 065	8 044	9 029	9 195	8 230
Chile	35	52	52	179	235	280	315
China	60	90	171	150	186	168	250
C.I.S. <sup>1</sup>	4 667	5 112	5 605	5 395	6 650	6 912	7 665
France	890	870	802	751	665	417	310
Germany	2 860	3 286	3 278	3 334	3 423	3 582	3 545
Israel	1 309	1 259	1 326	1 500	1 488	1 668	1 700
Italy	—	—	—	—	—	—	—
Jordan	822	930	1 068	1 059	849	916	1 080
Spain	661	684	650	680	640	497	550
United Kingdom	555	580	582	618	565	608	495
United States	1 525	1 400	1 480	1 387	1 465	1 300	1 300
<b>Total</b>	<b>20 407</b>	<b>22 687</b>	<b>24 302</b>	<b>23 331</b>	<b>25 475</b>	<b>25 870</b>	<b>25 775</b>

Sources: Natural Resources Canada; International Fertilizer Association; company interviews.

— Nil; <sup>e</sup> estimated; <sup>r</sup> Revised.

<sup>1</sup> Russia and Belarus.