

# 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 leading world 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

The world's potash supply/demand situation in 1998 was relatively balanced despite the prevalent financial crisis in Asia and the emergence of currency fluctuations in Latin America. Market conditions in 1998 were driven by a relative stable demand and suppliers reacted by adjusting production and sales, which led to an increase in inventories during the second half of 1998.

## World Potash Sales

Global potash sales declined to 24.8 Mt K<sub>2</sub>O,<sup>1</sup> along with a contraction in trade from the record level of 1997 due to strong deliveries at the end of 1997 to major importing countries and an expected reduction in imports in Southeast Asia due to a lagging economic and financial crisis in 1998.

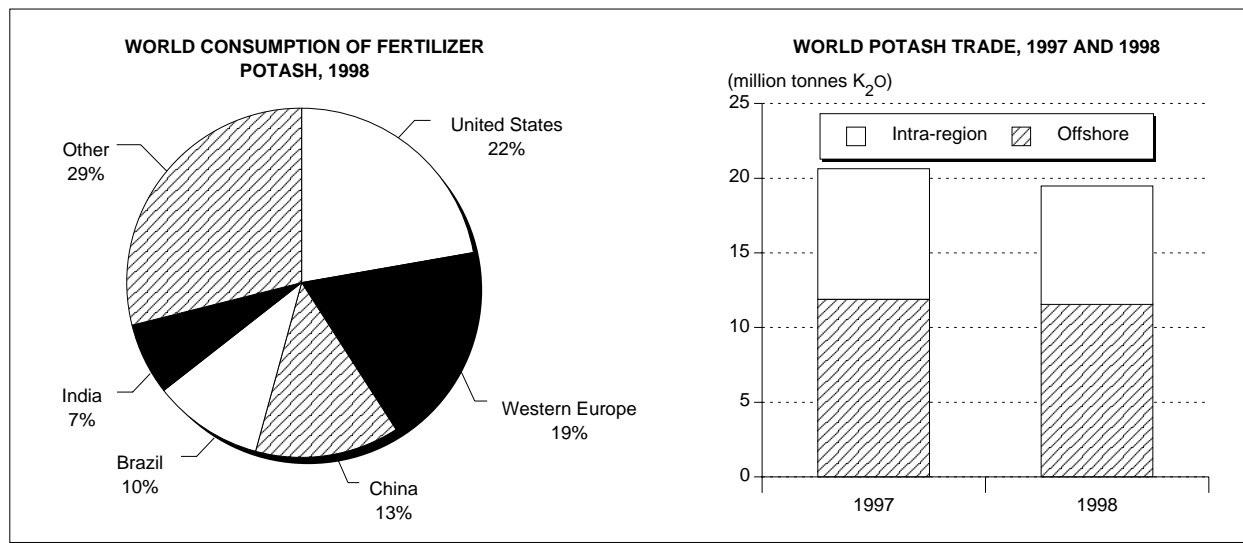
Despite the record 1997/98 world crop production, global grain inventories remain below the 18% stock-to-use ratio, which the Food and Agriculture Organization of the United Nations considers the minimum necessary to safeguard world food security. The global fertilizer sector was affected by depressed grain prices and low farm incomes in addition to economic weakness in most emerging markets. However, contrary to other mineral fertilizers, potash demand and prices remained firm in most offshore markets. Sustained demand in key markets such as Europe, China, India and Brazil offset reduced imports in other nations. The economic crisis that has been affecting Asia since 1997 had only marginal effect on potash sales in this region. World potash trade in 1998 declined to 19.4 Mt K<sub>2</sub>O, a 1.2-Mt decrease of which Canada contributed 85%. Offshore trade, accounting for 45% of total sales in 1998, was down only 3% from the record 1997 level.

World potash fertilizer sales in 1998 were estimated at 22.6 Mt K<sub>2</sub>O. Potash consumption in Asia, which accounted for 30% of world potash consumption, rose marginally. Strong sales to China and India offset lower sales in other countries in Southeast Asia, notably Japan, South Korea and Indonesia, due to the effect of the economic crisis that continued to prevail during 1998. Potash imports in China registered some increase over 1997; however, despite improving potash application, the nitrogen-to-potash ratio continued to remain deficient. Potash sales in India showed a sustained increase from the 1997 level, supported by a higher subsidy level for potash fertilizers,

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<sup>1</sup> Unless noted otherwise, statistical data refer to potassium oxide (1t KCl = 0.6t K<sub>2</sub>O).

**Figure 1**  
**Potash Consumption and Trade**



Source: Natural Resources Canada.

which rose by 50% to 3000 rupees per tonne of KCl (US\$71/t). Increased sales were registered in Malaysia and in the important emerging markets of Thailand and Vietnam.

Potash sales in Europe, which accounted for 18% of world potash consumption, were flat in 1998, but overall consumption is expected to continue to decline gradually as a result of lower crop prices and increased set-aside for 1999. In Central Europe, several countries continued to reform their agricultural program. Poland has been leading in terms of revitalizing its agriculture, along with other countries such as the Czech Republic and Hungary, where potash consumption has been growing steadily. The severe economic conditions in the C.I.S. hampered the agricultural sector and resulted in low grain production in 1998/99; potash use in the C.I.S. remained stable in 1998 after three successive years of increases.

Potash consumption in Latin America, which accounted for 14% of world consumption, remained firm in 1998. In Brazil, potash demand was sustained during most of the year, but financial and economic conditions deteriorated late in the year, leading to strict credit restrictions and a devaluation of its currency. Overall Latin American potash sales were marginally lower than in 1997, but remained at a relatively high level due to strong export prices for cash crop products and commodities early in 1998. In North America, which accounted for 24% of world consumption, potash sales declined 10% in response to relatively low grain prices. In the United States

the corn crop in 1998 was a bumper year; despite high domestic demand and strong exports due to lack of competition, production exceeded sales and resulted in inventory additions, helping to raise the stock-to-use ratio above the critical 14% level for the first time in the last three years. Fall sales for potash were weak in North America as the low domestic demand for grain was exacerbated by slow offshore sales.

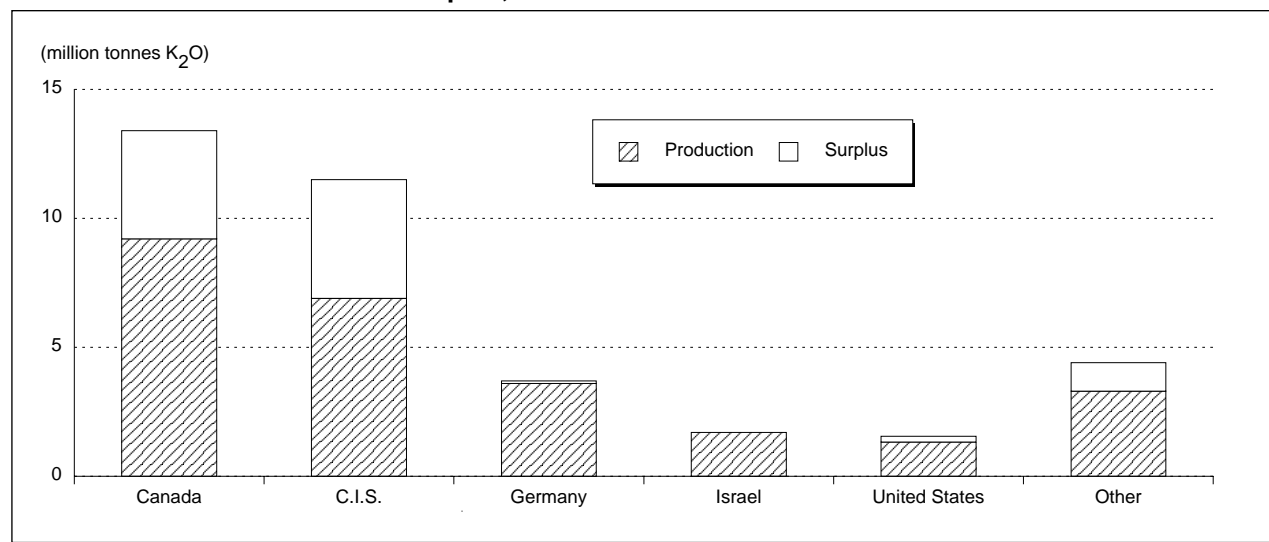
### World Potash Production

World potash production in 1998 was estimated at 25.9 Mt  $K_2O$ , a 1.5% increase compared to the previous year. Production increases were recorded in almost all major exporting countries with the exception of France, Spain and the United States. The C.I.S. and Germany accounted for 50% of the increase. Globally, potash producers operated at an overall capacity rate of 71% in 1998 compared to 69% in 1997.

Canadian operations ran at 69% of capacity and those in the C.I.S. ran at 58%, while all other major world producers operated at levels above 80%, with the exception of France (58%) and Spain (72%). In 1998, potash suppliers increased production in anticipation of firmer sales during the last quarter of the year, resulting in a significant 1.2-Mt  $K_2O$  increase in inventories reported in Canada and the C.I.S.

World capacity decreased marginally to 36.2 Mt/y  $K_2O$  as closures and reductions in Spain, France and the United States were not offset by expansions in

**Figure 2**  
**World Potash Production and Surplus, 1998**



Source: Natural Resources Canada.

Chile and Israel. Natural Resources Canada estimates that the world's potash production capability declined to 29.9 Mt/y K<sub>2</sub>O in 1998 from 31 Mt/y in 1997; the reduction is mostly accounted for by the flooding of the Potacan mine in the fall of 1997. The global surplus of capacity over production in 1998 was estimated at 10 Mt K<sub>2</sub>O, of which Canada and the C.I.S. contributed 90%.

## CANADIAN INDUSTRY

By year-end 1998, the potash industry in Canada was comprised of three companies that together employ 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 the compaction facilities 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

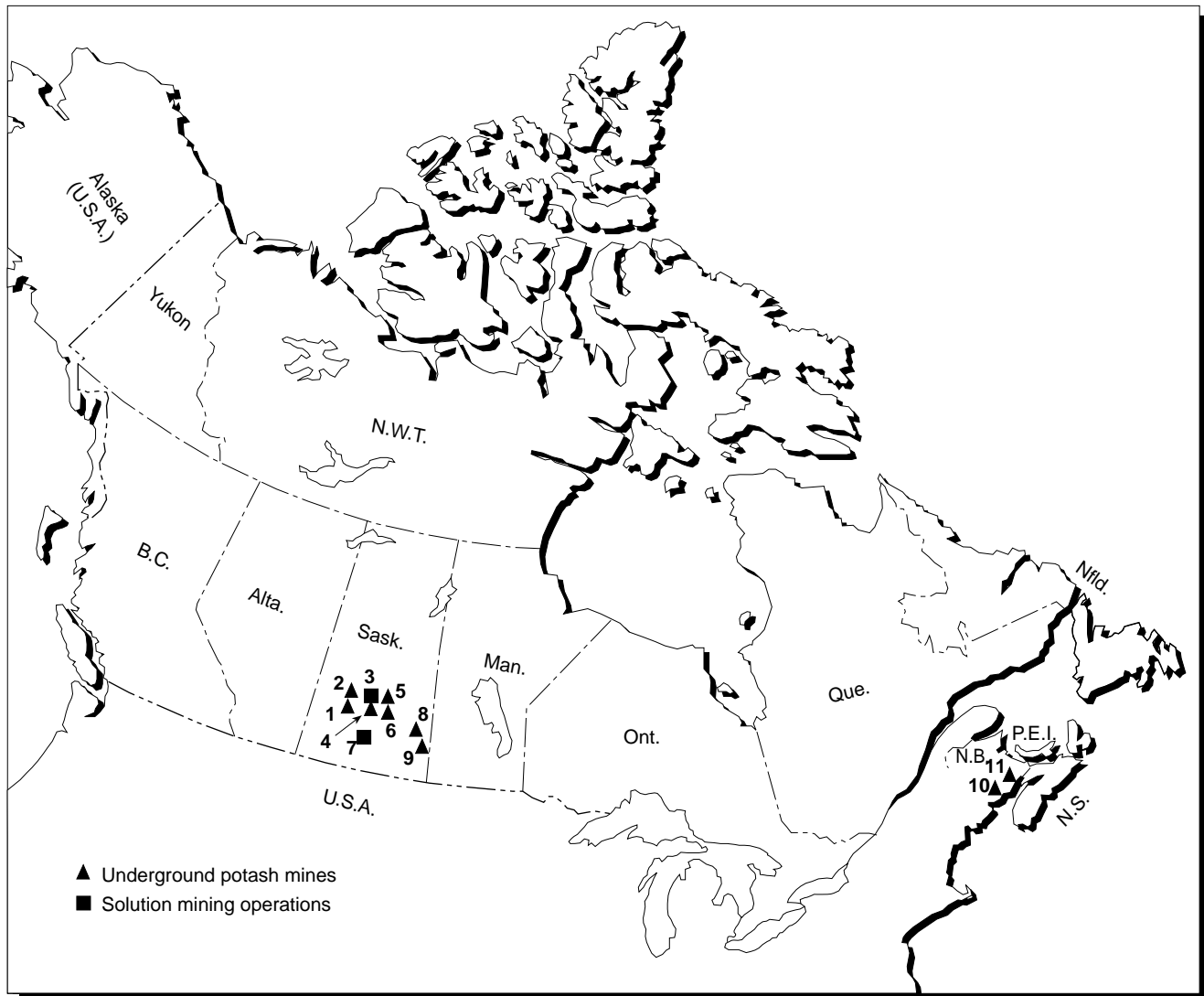
In 1998, Canadian potash production increased by 2% to 15 Mt KCl. Canadian potash shipments declined by 4% to 13.5 Mt KCl, a reduction mostly caused by weaker sales to U.S. markets. Canada's value of total potash sales (f.o.b. mines) was estimated at \$1.7 billion in 1998, compared to \$1.5 billion in 1997. Canadian inventories increased by 1.1 Mt to 2.6 Mt KCl.

Canada is the world's largest potash exporter with a 44% share of international trade. The C.I.S. is the second largest exporter, followed by Germany. Canada exports potash to more than 40 countries, although only six countries account for close to 80% of Canada's total potash exports. In 1998, Canadian potash was shipped mostly to the United States (60%) and Asia (25%), with the remainder being sent to Latin America (10%), Oceania (3%) and Europe (2%).

Canadian potash exports to almost every region decreased in 1998. Data compiled by Statistics Canada indicated that Canadian potash exports were valued at \$2 billion. The United States was the dominant destination for Canadian potash; in 1998, sales to the U.S. declined by 20%. In offshore markets, sales decreased by 5%. Sales to China remained stable; this country still accounted for 30% of all offshore potash exports from Canada. Shipments to Latin America decreased by 11% in 1998; Brazil, which accounted for 78% of Canadian sales in this region, registered a minor decrease, along with Cuba, Guatemala and Honduras. Sales to Europe dropped by 10% due to lower shipments to France and Belgium. Exports to Oceania declined 8% as lower sales to New Zealand were not offset by increases to Australia.

The major events in the Canadian potash industry during 1998 included the purchase of Potacan Mining Company of New Brunswick by Potash Corporation of Saskatchewan, the emergence of water inflows in the underground potash mine at PCS New Brunswick Division, and the continuation of incremental

**Figure 3**  
**Location of Potash Mines and Operations in Canada, 1998**



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)

expansions in some Saskatchewan potash operations. In 1998, Canada's annual potash capacity was estimated at 13.4 Mt  $K_2O$ , of which about 1.5 Mt consisted of idle milling units at the Cory, Lanigan and Patience Lake operations in Saskatchewan. Considering that capacity figures are based on milling, Canada's potash capability was estimated at 10.5 Mt  $K_2O$  (17.2 Mt KCl).

## Saskatchewan

Saskatchewan produced about 95% of total Canadian output in 1998. 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. The potash industry of Saskatchewan ranks as the world's most productive. Its productivity is more than 10 times that of the Russian industry, and three times more than that of the European potash producers. The Saskatchewan potash industry accounts for 33% of world production and 33% of world capacity.

In early 1998, the Province of Saskatchewan announced a series of measures in its tax regime for potash: the elimination of the top profit tax bracket of 50% (leaving 35% as the top rate); an expansion of the 15% profit tax bracket by 2001; the freezing of the base payment rate at the 1997 level; and a 35% depreciation rate applicable to all capital investment.

Potash Corporation of Saskatchewan Inc. (PCS), based in Saskatoon, is the largest publicly held potash producer in the world, holding 23% of the world's potash capacity. PCS operates five mines in Saskatchewan, 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 the Patience Lake solution mine, use conventional underground mining techniques. In 1998, 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 6.9 Mt KCl, an 8% increase compared to 1997; PCS's operating rate was 52%. Throughout 1998, 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 62% of Canada's total potash capacity. During 1998, PCS purchased a 9.03% stake in Israel Chemicals Ltd., but failed to acquire the assets of Grupo Potasas, which was sold by the Spanish government during the summer of 1998. PCS also contemplated the possible acquisition of the 53.3% interest in Israel Corp. held by the Eisenberg family (Israel Corp. holds a 52% interest in Israel Chemicals Ltd., which owns Dead Sea Works Ltd.).

IMC Kalium, a division of IMC Global Inc., manages four potash operations in Canada: the two interconnected underground mines, K1 and K2, at 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 6.5 Mt KCl (or 4 Mt/y  $K_2O$ ), or 30% of Canada's total potash capacity (and 12% of the world's). In 1998, IMC Kalium's production was estimated at 5.3 Mt KCl and its overall operating rate was 82%. During 1998, the company continued its important structural consolidation program at the Esterhazy mines in Saskatchewan to reduce water inflows that have been occurring for the past ten years with the objective of cutting the inflow rate to its minimum by 2000. IMC Kalium pursued its expansion program at Belle-Plaine and, late in 1998, decided to postpone the expansion at Colonsay due to the current global oversupply. IMC Global purchased the assets of Harris Chemical Group and became one of the largest salt operators in Canada.

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 1998, Agrium Inc. produced close to 1.6 Mt KCl and operated at 89% of capacity (80% in 1997). During 1998, Agrium pursued the construction of a new phosphate mine at Kapuskasing in northern Ontario. The operation will be commissioned in the fall of 1999 and the \$75 million project will create 100 permanent jobs. Phosphate concentrates will be sent to Agrium's fertilizer facilities in Redwater, Alberta, to replace imported phosphate rock from Togo.

Big Quill Resources Inc. manufactured potassium sulphate from sodium sulphate brine at Big Quill Lake and from purchased potassium chloride. The company, located in Wynyard, expanded its production capacity to 60 000 t/y of secondary potassium sulphate ( $K_2SO_4$ ). The company operated an ion exchange 10 000-t/y unit and commissioned a 50 000-t/y unit using the glaserite process. 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 wall-board 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 Penobscus underground mine about 5 km east of Sussex. The operation experienced minor water inflows in its underground mine; however, the water condition did not affect mining operations. The company registered a record production level in 1998 of more than 780 000 t KCl, exceeding its estimated capability and quoted capacity. The mine continued to operate throughout the year at high capacity utilization. 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. PCS may, in the near future, investigate the possibility of expanding its mining operation at the PCS New Brunswick Division in Sussex.

In early 1998, PCS completed the purchase of Potash's assets from its European owners, renaming the operation as PCS Cassidy Lake Division. The processing mill was used to upgrade standard-grade products from Saskatchewan into granular products for markets in eastern Canada and the United States.

## Manitoba

Late in 1998, both parties involved in the Manitoba Potash Corporation, a joint venture between Entreprise minière et chimique of France and the Government of Manitoba, expressed an intention to assess 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<sub>2</sub>O. Initial development plans in the 1980s called for a 2-Mt/y potassium chloride mine.

## INTERNATIONAL DEVELOPMENTS

In 1998, world production of potash rose to meet a sustained demand and refurbish the prevailing low inventories at year-end 1997. World production increased by 1.5% to 25.9 Mt K<sub>2</sub>O. Most of the 0.5-Mt increase occurred in the C.I.S. (45%) and Canada (30%). North America was the major producing region with a 40% share of world potash output; Canada contributed 35% to world production in 1998, followed by the C.I.S. (27% share), Western Europe (20%) and the Middle East (10%).

### The Americas

In Brazil, potash production by Companhia Vale do Rio Doce increased by 19% over 1997. Capacity is

expected to increase to 700 000 t/y of potassium chloride by 2000, in combination with a 100 000-t/y compaction capacity for the production of granular potash products.

In Chile, potash production rose by 6% over 1997. SQM Salar S.A., a subsidiary of Sociedad Química y Minera de Chile S.A., completed the second phase of its Minsal project at Salar de Atacama that included a new 250 000-t/y potassium sulphate plant. Another expansion of its current potassium chloride capacity is being envisioned. SQM and Norsk Hydro entered into an agreement for the construction of a new 150 000-t/y potassium nitrate operation in northern Chile; the project will be completed after 2000. Minera Yolanda S.A., a subsidiary of Kap Resources Ltd. of Vancouver, continued to face technical and financial difficulties at its 250 000-t/y potassium nitrate facility at Yumbes in northern Chile. Atacama Minerals Corporation, a subsidiary of Boron Chemicals International Ltd. of Vancouver, indicated that its development plans at Aguas Blancas in northern Chile will now focus on iodine; a 70 000-t/y potassium nitrate facility might be considered after 2005.

In the United States, potash production declined by 10% in 1998 and the industry operated at 86% of capacity. Late in 1997, Mississippi Chemical Corporation announced the permanent closure of its 300 000-t/y potassium chloride Eddy Potash mine in Carlsbad, New Mexico. In 1998, Mississippi Chemical Corporation announced an expansion at its Mississippi Potash West facility in Carlsbad to reach a capacity of 0.5 Mt/y KCl. Also in 1998, IMC Global concluded the acquisition of the assets of Harris Chemical Group Inc. (HCG), which included the potash operation of Great Salt Lake Minerals Corporation at Ogden, Utah, where capacity was expanded to reach 500 000 t/y of potassium sulphate by year-end 1998. IMC also announced plans for combining sylvinitic and langbeinitic ore extraction from its Carlsbad operation and from the former Western Ag-Minerals mine, as well as plans to construct a new potassium-magnesium potash processing facility in Carlsbad to be completed in 1999.

### C.I.S.

Potash production in the C.I.S. in 1998 increased for the third consecutive year and reached 6.9 Mt K<sub>2</sub>O. The annual operating rate was close to 58% of capacity, compared with 56% in 1997. Russia's potash production was stable at 3.5 Mt K<sub>2</sub>O with an overall operating rate of 54%; its potash was produced by Uralkali Ltd. and Sylvinit Ltd. In Belarus, potash production rose 10% to 3.5 Mt K<sub>2</sub>O; PO Belaruskali operated at 63% of capacity, its highest level for the past six years. C.I.S. potash deliveries totalled 6.6 Mt K<sub>2</sub>O due to sustained offshore and domestic sales. Domestic deliveries remained stable at 1.4 Mt K<sub>2</sub>O in 1998; Belarus delivered 57% of domestic

sales. A new investment organization has been set up in Russia, InterAgroInvest, which is a joint venture of multiple interests, including IPC and the potash producers in the C.I.S. The group was set up to secure investment in the domestic potash production, transportation and distribution sectors. In mid-1998, Uralkali commissioned a new secondary potassium sulphate facility at Berezniki 3; its feedstock is pink potassium chloride from the same potash plant. Its annual capacity is estimated at 120 000 t/y  $K_2SO_4$  (60 000 t/y  $K_2O$ ).

Total C.I.S. exports increased by 3% to 5.2 Mt  $K_2O$  in 1998. Exports rose in most regions with the exception of Latin America. Major export destinations were China (1.3 Mt  $K_2O$ ), followed by Brazil (0.6 Mt), Central Europe (0.6 Mt), India (0.7 Mt) and the United States (0.3 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 are also moved by rail to the Far East Port of Vostochny for delivery in Southeast Asia. Several terminal facilities are being expanded at numerous ports within the C.I.S. and in the Baltics (Klaipeda, Ventspils, Murmansk, Ust Luga, and St. Petersburg). In 1998, JSC Kalija Parks in Latvia inaugurated a new storage facility at its potash terminal in the port of Ventspils. Total new storage was expanded by 40 000 t and raised the terminal's potash handling capacity to 5.5 Mt/y KCl. A new berth, which will be equipped with a 3000-t/h ship loader, is scheduled for completion in 1999. Additional projects for increasing the handling volume at the terminal are planned to bring it to a capacity of 6.5 Mt/y of products in the medium term.

## Europe

In early 1998, the European Commission completed its three-year administrative review of existing anti-dumping measures against C.I.S. potash-producing countries and implemented a 7% decrease on the minimum import prices while maintaining fixed duties for each producing country. In March 1999, the Commission initiated a full review of the anti-dumping measures applicable to imports of potassium chloride originating in Belarus, Russia and Ukraine. Late in 1998, the European Association of Potash Producers filed a request for review following a notice of impending expiry of the measures.

In France, potash production continued to decrease for the sixth consecutive year as a result of the phase-out of potash mining in Alsace. Its 1998 production declined by over 35%. According to the Société Commerciale des Potasses et de l'Azote, the two remaining French mines are forecast to close between 2002 and 2004, and production is expected to decline gradually. Mines de Potasse d'Alsace (MDPA) closed one of its three operating mines in early 1998; the Marie-

Louise Est mine and its three operating shafts (Marie-Louise, Marie and Schoenensteinbach) at Staffelfelden closed after 85 years of operation due to ore exhaustion. The two remaining operating shafts, Berwiller at Marie-Louise Ouest and Amélie 1 at Amélie, will close in 2002 and 2004, respectively. The crystallization units at Marie-Louise will be shut down in 1999 and all potash ore will be processed at the remaining flotation plant at Amélie.

In Germany, potash production rose marginally. In 1998, BASF continued to sell its shares in K&S Beiteiligungs AG (K&S) to private investors; as a result, BASF has reduced its shareholding to less than 25%. K&S is now the sole owner of the operating German potash company following its purchase of the 49% share of Kali und Salz GmbH from Beiteiligungs-Management Gesellschaft mbH, the state agency for the privatization of the former East German industry. In 1998, K&S continued its development work in Hessia with the goal of merging the underground operations of Hattorf and Wintershall.

In Spain, potash production declined by 22% as a result of the completion of the closure of Potasas de Subiza's mine in Navarra. Potash is now extracted from two mines at Llobregat and Suria in Catalonia. In 1998, the Spanish government privatized the potash mining group, Grupo Potasas, which comprises Potasas de Llobregat, Suria K, Commercial de Potasas, Société Générale des Sels et Potasses, and Trafico de Mercancias. Dead Sea Works Ltd. (DSW) of Israel and two Spanish companies purchased Grupo Potasas for US\$123 million; the company is now operating under the name of Iberpotash. Later in 1998, DSW announced plans to increase current Spanish potash output over the next five years.

In the United Kingdom, Cleveland Potash Ltd.'s (CPL) production rose 8% over 1997. In early 1999, CPL's underground potash mine at Boulby in north-eastern England was being affected by water inflows that occurred in a conveyor roadway leading to a production stope in the southern part of the mine. The company indicated that potash production will be significantly reduced during the first half of 1999 as potash ore will only be extracted from stopes in the northern part of the mine. This underground operation is among the deepest in the world at 1100 m, and feeds a 1.1-Mt/y KCl potash milling facility. CPL is reported to have plans for expanding its production of granular potash products.

## Middle East

In Israel, DSW's production rose 13% in 1998. The company continued to remove salt pillars from the solar evaporation ponds for improving its overall carnallite recovery. DSW announced a US\$90 million plan to expand its potash operation at Sdom, including new equipment for industrial-grade potash products and compaction units for granular potash

grades. Total capacity is expected to reach 2.8 Mt/y KCl by 2000. Israel Chemicals, which was founded by the Israeli government, has been gradually privatized since 1992; late in 1998, the government sold its remaining 31.5% interest in a public offering. Haifa Chemicals Ltd. was reported to invest US\$45 million for a 100 000-t/y potassium nitrate expansion at its Mishor Rotem facility by 1999.

In Jordan, potash production by the Arab Potash Co. Ltd. (APC) increased by 14% and the operation ran at 85% of capacity. APC continued to work on its expansion program at Safi to increase capacity by 20% to 2.2 Mt/y KCl of potassium chloride in 2002; a second phase is also being contemplated for another 200 000 t/y KCl by 2004. Jordan Dead Sea Industries Company, in which APC has a 51% controlling interest, signed an agreement with Ching Hsiang Chemicals of Taiwan to construct a new 40 000-t/y potassium sulphate plant in Aqaba to be completed in 2001; 75% of its production will be dedicated for exports. APC and Kemira Agro of Finland announced a new joint venture to construct a US\$70 million potassium nitrate plant in Safi; the 150 000-t/y KNO<sub>3</sub> facility is scheduled for completion in 2001.

## Asia

In China, potash production was estimated at 170 000 t K<sub>2</sub>O. In 1998, the specialized press reported progress in the joint venture involving Dead Sea Works and the Eisenberg Group of Companies of Israel; a memorandum of understanding was signed to settle the financial aspects after nine years of discussions. The project calls for the construction of an 860 000-t/y potash mine to be developed at Qarhan Salt Lake in the northwestern Qinghai Province. The mine is expected to be commissioned in 2004. Partners in the project include the United Development Industry Co. of Israel, Mingda Corporation, and the Qinghai Salt Lake Industrial Group of China.

In northeastern Thailand, the ASEAN Potash Mining Co. (APMC) continued its construction work to develop a salt-potash mine at Bamnet Narong. The US\$590 million project is for an underground mine with a capacity of about 1 Mt/y of potassium chloride. The construction of a 935-m-long decline to the 180-m level was completed at the end of 1997. In 1998, APMC contracted work for construction of the second decline drift into the carnallite orebody and started development work on the first salt stope from which were extracted 50 000 t of salt and 50 000 t of carnallite grading 12% K<sub>2</sub>O. APMC plans to award engineering design contracts in early 1999 and to assess options for the disposal of sub-product magnesium brines, including through deep-well injection. APMC expects to produce 0.5 Mt/y of salt and to start potash mining by 2003.

Also in northern Thailand, Asia Pacific Potash Corporation (APPC) completed a bankable feasibility study in 1998 for the development of a sylvinite 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 sylvinite ore grading 23% K<sub>2</sub>O. Access to the mine will be by twin declines to a depth of 350 m. Ten continuous mining machines will extract close to 6 Mt/y of ore using a chevron room and pillar technique. In 1998, Asia Pacific Resources Ltd. of Vancouver (APR) acquired the holding interest of Metro Resources Ltd. in APPC. The transaction increased APR's effective interest in APPC from 62.5% to 90%; the remaining 10% interest is held by the Government of Thailand. In mid-year, APR and Norsk Hydro Asia Pte. Ltd., a subsidiary of Norsk Hydro ASA of Norway, signed a Memorandum of Understanding for the financing and development of the Udon Thani potash resources. Norsk Hydro would become an equity participant in APPC and market all the potash produced from the Somboon mine. A decision to start construction is expected in 2000 for completion in 2004. The total cost of the project, which is expected to employ 1400 workers, has been estimated at US\$500 million.

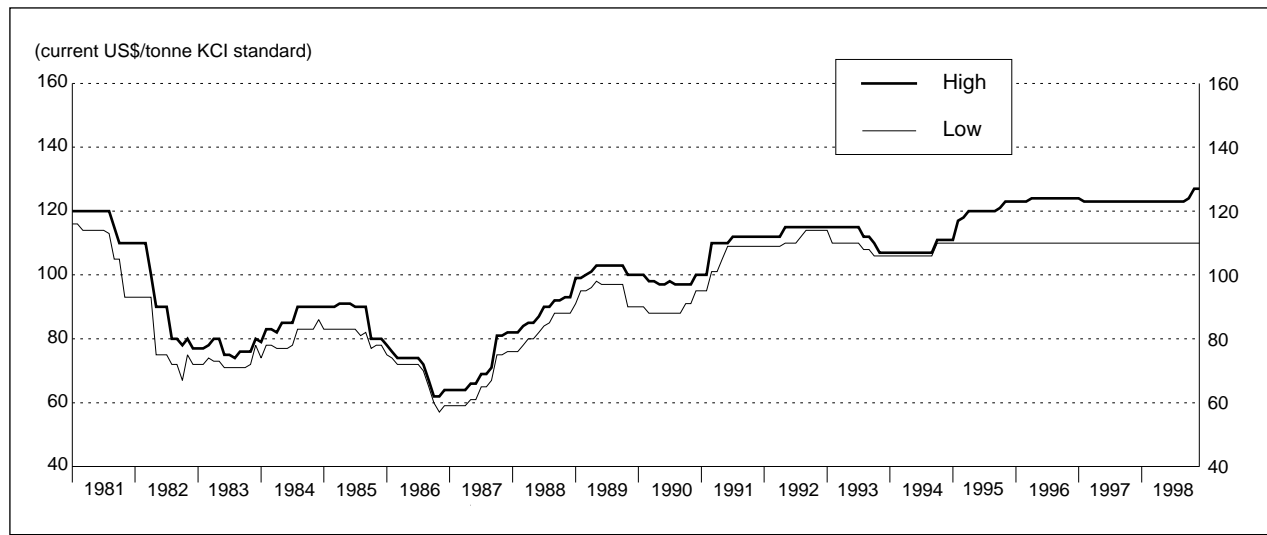
## PRICES

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.

Offshore potash price quotations were firm in 1998, registering a slight increase by year-end 1998 and early 1999. For 1998, price quotations rose by 2% to an average of US\$118.50/t standard KCl f.o.b. Vancouver. Entering 1997, f.o.b. Vancouver potash prices were quoted averaging US\$116.50/t KCl for standard grade. During the first half of the year, sales to China provided an upward momentum to world offshore trade and prices. However, a price increase achieved in China did not translate into subsequent increases in other offshore contracts. The international market continued to firm up in the first half of 1998 following a price increase in Japan. In the beginning of the second half of 1998, potash markets remained firm with sustained prices. Many exporters sought a second price increase, which ultimately did not materialize due to a slowdown in trade and the residual effect of the economic crisis affecting Asia and spreading to Brazil. By the end of



**Figure 4**  
**Canada, Offshore Potash Price Quotations, 1981-98**  
 f.o.b. Vancouver Contract



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

the year, price quotations were relatively steady at an average of US\$118.50/t. With favourable market perspectives for 1999, price quotations were moving upward in the first quarter of the year. In other offshore business, C.I.S. potash prices were quoted at US\$85-\$90/t for standard potash f.o.b. Baltic ports in 1998, and remained at that level until the third quarter. By year-end, the price had risen to reach US\$95-\$105/t for an average 15% increase for the entire year.

In North America, quotations f.o.b. Midwest on coarse-grade potash started at US\$114-\$120/short ton (st) in January 1998. Despite some tardiness in spring planting due to early rain, overall demand was sustained and supply was tight, a combination that led to another price increase in the spring of 1998 to US\$119-\$123/st. During the second half, after a seasonal correction during the summer, quotations rose to reach US\$120-\$124/st. Domestic demand has slowed with a weak fall season due to lower expectations for 1999 and successive price increases. On average, potash prices in the United States increased 20% over 1997. The gap between low and high quotations tended to increase by year-end, signalling some stability in the first quarter of 1999.

## OUTLOOK

Despite the record 1997/98 world crop, the global grain stocks-to-use ratio rose marginally from 16% to 18%, a level that is still considered to be near the minimum for world food security. Low grain prices in 1998 have resulted in a recovery in world domestic

and offshore sales, yet have also moved prices upward in 1999. Improvements for fertilizer demand are projected by 2000 as fundamental agricultural needs support a sustained demand for fertilizers to increase food production and quality in a global environment where the supply of arable land is declining. 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.

## World Potash Demand

In the European Union, long-term demand for fertilizer is forecast to decline due to improved land management and more efficient fertilizer usage. Important socio-economic changes are expected over the next 10 years as the European Union becomes larger. The Common Agricultural Policy outlined in the "Agenda 2000" is expected to result in a reduction in the use of fertilizers and an improvement in farming practices. Acreage set-aside beyond 2000 is foreseen at 0%, although voluntary set-aside is expected to continue. By 2007, potash nutrient consumption is projected to reach 3.9 Mt K<sub>2</sub>O, a 7% decline over the next 10 years.

In Central Europe, increased fertilizer use is expected to accompany significant agricultural development and the rebuilding of soil fertility in several countries, including Poland and Hungary.

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. Farming in most republics is predominantly carried out in former state and collective farms. Over the next 10 years, potash consumption is forecast to recover, albeit not at the level that prevailed prior to 1988 when fertilizer application was dictated by central agencies. By 2007, potash demand could reach 2.4 Mt K<sub>2</sub>O, doubling the 1998 level (but one third of the record level set in 1988).

Potash application in the United States in 1999 is projected to be marginally lower than in 1998 as the result of lower acreage for corn and wheat. In 1999, a US\$5.9 billion disaster relief support was approved to provide farmers with income supplement. In the medium to long term, potash demand is forecast to be stable, with some anticipated increase in the near term (2000-02). The *Freedom to Farm Act* has allowed farmers to better respond to market conditions. Fertilizer potash demand is forecast to reach 5.3 Mt/y by 2007.

Sales to Brazil are projected to be stable as credit and currency pressures are alleviated. Brazil offers much potential for agricultural land and crop diversity; its agriculture is highly geared toward export cash crops such as coffee, sugar cane, soybeans and fruits, rather than mainstay crops, which results in a distinctively favourable nitrogen-to-potash nutrient ratio of 1:1.65 (compared to North America at 1:0.44), and which explains the high level of potash consumption. In the long term, there are opportunities to increase potash use by improving the potassium application rate in basic food crops such as corn, and the nitrogen application rate in certain cash crops. An increase in the application of nitrogen to the recommended level could result in additional total potash demand of close to 1.2 Mt K<sub>2</sub>O. With current potash consumption at around 2.1 Mt, the potential demand could reach 3.3 Mt/y by 2007.

Potash demand in India is projected to remain stable in 1999. In the short term, fiscal and regulatory measures that are being introduced by the Government of India will affect the current subsidized and expensive domestic market structure. In early 1999, India imposed a 5.5% import duty on fertilizers that previously were exempt from such levies. During 1999, the Government of India is expected to revisit its current subsidy scheme and to liberalize the minimum retail price structure for fertilizers. In the long term, potash demand in India has the potential to increase by 50% between 1998 and 2007, and to reach 2.2 Mt/y to meet its need for improving crop yields and correcting the resilient nutrient imbalance in the nitrogen-to-potash ratio (1:0.12 compared to a potential of 1:0.18; the optimal ratio is reported at 1:0.25).

In China, positive economic growth continues in accordance with its current Five-Year Economic Plan that focusses on developing its agricultural sector by raising grain production, improving farming practices, and facilitating access to domestic fertilizers. The imbalance in the reported nitrogen-to-potash ratio (at 1:0.10) remains below the optimum target (1:0.20); Chinese potash consumption would need to double in order to meet its optimal agronomic nitrogen-to-potash ratio, leading to a potential for imports at close to 5 Mt/y K<sub>2</sub>O by 2007.

Total world demand for potash in 1999 is projected at 26 Mt K<sub>2</sub>O, including 23.4 Mt K<sub>2</sub>O for fertilizer potash (a 3% increase over 1998), 1.6 Mt K<sub>2</sub>O for industrial uses, and around 1.0 Mt K<sub>2</sub>O as a distribution gap. Most of the increase in demand during 1999 will be registered in Asia, while potash fertilizer consumption is expected to continue to recover in Europe, the C.I.S. and Latin America.

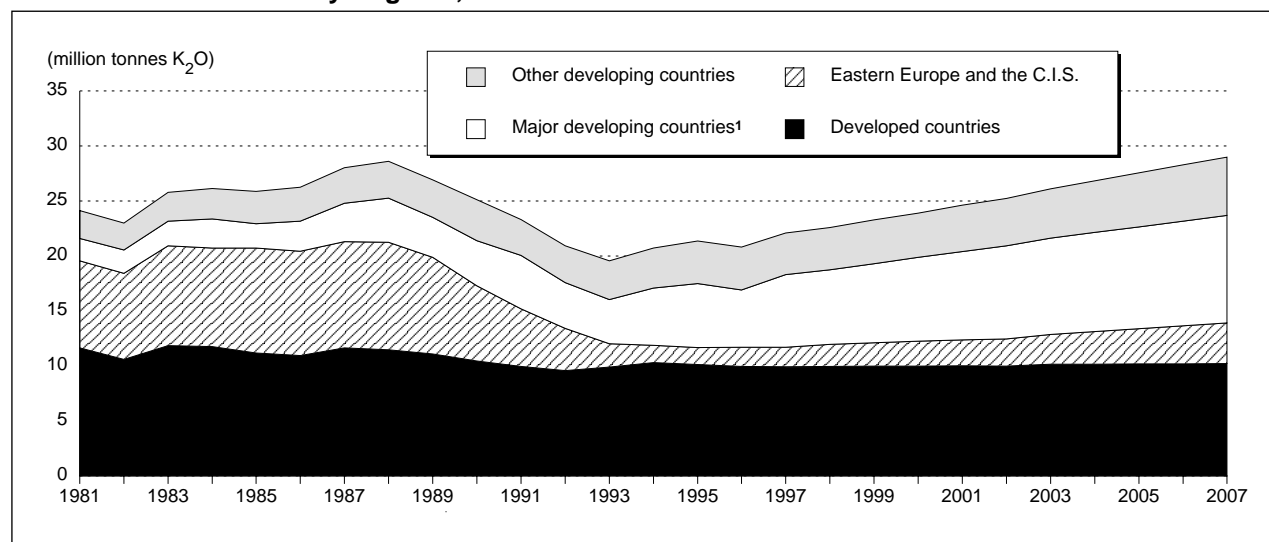
### Long-Term Potash Demand

In the long term, world potash demand is expected to continue to expand, following a trend that has emerged since 1993. Fertilizer potash demand for the period 1997-2007 is forecast to grow by an overall 30%, or at an annual rate of 3% to reach 29 Mt/y by 2007. Most of the 7-Mt/y increase in this 10-year period will be registered in Asia (50%), followed by the Americas (25%) and the C.I.S. and Central Europe (25%). World demand for industrial potash is projected at 2 Mt/y K<sub>2</sub>O by 2007. 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 Mt/y K<sub>2</sub>O by 2007, compared to 24.5 Mt in 1997. Growth in developed countries will be marginal, while Central Europe and the C.I.S. are expected to register a sustained recovery, accounting for 13% of world fertilizer potash demand in 2007 compared to 8% in 1997. Most of the growth in potash consumption will come from developing countries, which will account for 52% of world demand for fertilizer potash, compared to 47% in 1997.

### World Potash Supply

On the supply side, current potash capacity from established producers is expected to increase marginally as incremental expansions offset the anticipated closure of the French mines. The capacity from current producers in 2007 is estimated at around 37 Mt/y, compared to 36.4 Mt/y in 1997. 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

**Figure 5**  
**World Potash Demand by Regions, 1981-2007**



Source: Natural Resources Canada.

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

marginal cost of new capacity has been more favourable than the unit cost associated with the opening of new mines.

For the past six years, the sustained demand for potash in developing countries combined with the prospect of accrued growth over the long term have led several promoters to find adequate economic resources and design plans for new potash operations in favourable locations, i.e., near growing markets. A series of new projects has been scheduled for development in the medium to long term associated with different levels of probability of success and timeliness. Projects in Asia (China and Thailand) have been initially deemed for commissioning in the 1999-2000 period and, if they occur, production would most likely emerge post-2004/05. These projects are estimated to have a medium to high level of probability of occurrence and would add close to 2.4 Mt/y of new capacity by 2005. Other developments are being assessed as more tentative (in Argentina, Congo, Ethiopia, Manitoba and Oman) and would, if realized, add a marginal increase of 1.8 Mt/y K<sub>2</sub>O to world capacity after 2005. Between 2000 and 2007, most projects for new mines will be located in potash-consuming and importing regions; these new operations may have the potential to change current trade patterns, which will affect major suppliers to these regions. Established trading countries such as Canada, Germany and the C.I.S. face the possibility of new competition impacting on their market share, unless the commissioning of these new mines are concurrent with an expansion in demand in developing countries. However, producers in Russia, Belarus

and Germany are likely to benefit from the phase-out of potash capacity in France by 2004 and the anticipated recovery of potash demand in Central Europe and the C.I.S.

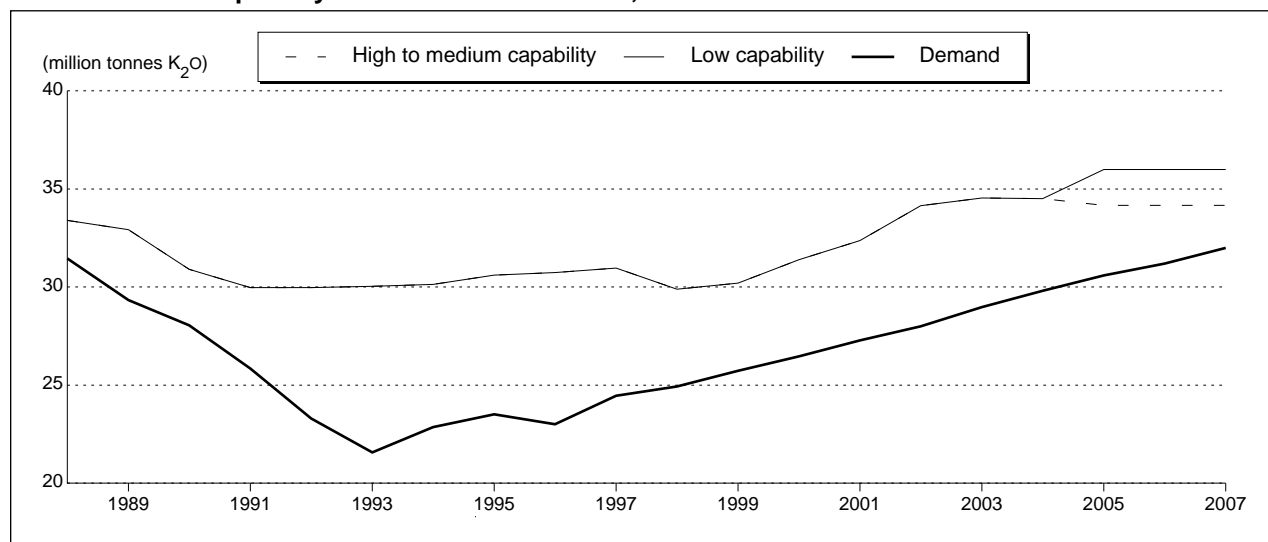
The global potash capacity has the potential to increase by an overall 8% to 41.2 Mt/y in 2007, of which 85% may come from new projects. For the next 10 years, the world's potash supply/demand balance is forecast to face a declining surplus. Based on capacity projections and demand forecasts, this surplus is expected to decline very gradually from 11 Mt K<sub>2</sub>O in 1997 to 9 Mt/y by 2007. This surplus will be distributed among several producers, including those in Canada and the C.I.S. New producers in emerging nations will likely enter the marketplace in a period of sustained demand and declining surplus, but will also face competition among themselves for operating at economic, profitable levels.

A better measure of world 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 1998 was estimated by Natural Resources Canada at around 30 Mt K<sub>2</sub>O for a marketable surplus over demand of about 5 Mt K<sub>2</sub>O. By 2007, the world's potash capability, including new projects with a medium to high probability of occurrence, is projected at about 34 Mt/y with a marketable surplus of close to 2 Mt/y K<sub>2</sub>O. The surplus-to-demand ratio would be reduced from the current 20% level down to less than 7% in 2007. However, if all announced projects were to be commissioned by

2005, the global capacity would have the potential to exceed 41 Mt/y  $K_2O$ , with capability estimated at more than 36 Mt/y. The consequent excess of capability in 2007 would be close to 4 Mt, equating to a ratio above 13% and indicating a trend toward a new extended surplus period.

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 March 31, 1999.

**Figure 6**  
**World Potash Capability Scenarios and Demand, 1988-2007**



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 1999, Revenue Canada; Harmonized Tariff Schedule of the United States, 1999.

TABLE 1. CANADA, POTASH PRODUCTION, SHIPMENTS AND TRADE, 1997 AND 1998

Item No.	1997		1998p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
<b>PRODUCTION, Potassium Chloride</b>					
Gross weight	14 711 940r	..	15 131 432	..	
K <sub>2</sub> O equivalent	8 989 417r	..	9 269 978	..	
<b>SHIPMENTS</b>					
K <sub>2</sub> O equivalent	9 234 742r	1 528 341r	8 968 981	1 666 978	
<b>IMPORTS, Fertilizer Potash</b>					
3104.20	Potassium chloride, in packages weighing more than 10 kg				
	United States	4 421	586	4 416	608
	France	231	31	402	55
	United Kingdom	44	5	29	5
	Spain	-	-	1	2
	Germany	29	3	4	1
	Switzerland	2	1	2	..
	Belgium	124	18	-	-
	Total	4 851	644	4 854	671
3104.30	Potassium sulphate, in packages weighing more than 10 kg				
	United States	5 843	1 886	7 607	2 274
	Russia	-	-	869	988
	Belgium	-	-	231	116
	United Kingdom	2	3	6	6
	Germany	10	22	3	4
	Japan	-	-	2	2
	Canada	-	-	..	1
	Mexico	..	1	-	-
	Total	5 855	1 912	8 718	3 391
3104.90.00.10	Magnesium-potassium sulphate				
	United States	70 049r	16 216r	69 765	14 458
	Total	70 049r	16 216r	69 765	14 458
3104.90.00.90	Other potassic fertilizer				
	United States	5 502	1 896	8 275	2 623
	Chile	80	46	185	108
	China	86	36	203	98
	Israel	20	14	188	96
	Mexico	23	14	19	15
	Italy	-	-	12	4
	New Zealand	-	-	2	1
	Total	5 711	2 006	8 884	2 945
<b>Potash Chemicals</b>					
2815.20	Potassium hydroxide (caustic potash)	18 402r	10 979r	18 855	11 177
2834.21	Potassium nitrate	6 111r	3 468r	7 912	4 673
2835.24	Potassium phosphates	1 260	1 346	1 486	1 721
2836.40	Potassium carbonates	2 085r	1 418r	2 551	1 855
2839.20	Potassium silicates	1 206	600	1 149	585
	Total potash chemicals	29 064	17 811	31 953	20 011
<b>EXPORTS, Fertilizer Potash<sup>1</sup></b>					
3104.20	Potassium chloride, in packages weighing more than 10 kg				
	United States	8 553 080r	892 447r	8 546 315	1 125 230
	China	1 773 854	258 485	1 729 553	257 394
	Brazil	1 169 755r	152 511r	1 008 034	144 869
	Malaysia	475 071	69 209	514 758	77 066
	Japan	569 383	84 296	459 453	69 604
	Australia	249 523	35 877	299 945	45 068
	South Korea	343 503	49 996	296 385	44 421
	Taiwan	209 698	30 539	196 379	29 584
	Thailand	93 472	13 608	188 254	28 346
	New Zealand	161 928	23 287	177 097	26 883
	Italy	88 430	12 534	119 445	18 282
	Belgium	122 298	17 587	98 297	14 809

**TABLE 1 (cont'd)**

Item No.	1997		1998P		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
<b>EXPORTS (cont'd)</b>					
Vietnam	56 011	8 178	91 785	13 932	
Spain	36 935	5 735	97 165	12 192	
Indonesia	123 985	18 071	51 216	8 065	
Guatemala	36 229	5 193	53 510	7 898	
India	20 242	2 960	49 737	7 775	
Philippines	33 220	4 692	43 518	6 596	
Chile	52 436	7 265	40 036	6 046	
Colombia	32 831	4 122	35 900	5 516	
Denmark	15 750	1 773	31 468	3 765	
Cuba	72 600	8 165	25 600	3 210	
El Salvador	—	—	19 600	2 831	
Dominican Republic	17 118	2 268	18 600	2 414	
Mexico	17 539	2 217	16 955	2 143	
France	68 940	8 710	14 218	1 783	
South Africa	—	—	10 155	1 541	
Venezuela	26 761	3 912	10 500	1 322	
Fiji	16 520	2 717	5 474	861	
Argentina	4 700	678	3 000	470	
United Kingdom	9 072	1 128	72	42	
Costa Rica	51 295	7 441	—	—	
Honduras	19 250	2 189	—	—	
Ecuador	15 947	1 978	—	—	
Jamaica	4 800	566	—	—	
Panama	3 000	363	—	—	
Total	14 545 176r	1 740 697r	14 252 424	1 969 958	
3104.30	Potassium sulphate, in packages weighing more than 10 kg				
	United States	7 745	3 454	10 670	5 439
	South Korea	—	—	17	102
	Australia	—	—	166	80
Total	7 745	3 454	10 853	5 621	

Sources: Natural Resources Canada; Statistics Canada.

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

1 Countries are ranked in descending order of value, based on 1996 data.

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

**TABLE 2. CANADA, POTASH PRODUCTION AND SALES IN 1997, AND BY QUARTER, 1998**

	Total 1997	1998				Total
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
(000 tonnes, K <sub>2</sub> O equivalent)						
Production	9 027.5	2 562.0	2 618.6	1 958.6	2 054.2	9 193.4
Sales						
North America	5 784.6	1 277.0	1 226.6	1 294.2	979.5	4 777.3
Offshore	3 723.7	940.0	1 208.8	765.2	575.2	3 489.2
Total	9 508.3	2 217.0	2 435.4	2 059.4	1 554.7	8 266.5
Ending inventories						
Mine site	460.1	460.9	532.4	630.9	950.7	n.a.
Off site	476.4	704.2	728.1	417.6	567.2	n.a.
Total	936.5	1 165.1	1 260.5	1 048.5	1 517.6	n.a.

Source: Potash and Phosphate Institute, 1998.

n.a. Not applicable.

**TABLE 3. CANADA, POTASH INVENTORY, PRODUCTION, DOMESTIC SALES AND EXPORT SALES, 1998**

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	936.5	897.7	9.9	1.8	11.7	375.1	50.6	425.7	437.4	314.6	752.1
February	1 038.9	807.4	38.7	2.3	41.0	423.5	46.3	469.7	510.7	243.4	754.2
March	1 053.3	856.9	20.0	3.1	23.0	248.2	57.7	305.8	328.9	381.9	710.8
Subtotal, 1st quarter		2 562.0	68.6	7.2	75.7	1 046.8	154.6	1 201.3	1 277.1	940.0	2 217.1
April	1 165.1	885.1	72.1	1.2	73.3	416.5	41.9	458.4	531.7	294.2	825.9
May	1 135.6	923.9	117.8	1.6	119.5	326.9	41.9	368.8	488.2	389.8	878.1
June	1 202.0	809.7	23.6	2.4	25.9	133.3	47.3	180.7	206.6	524.7	731.3
Subtotal, 2nd quarter		2 618.6	213.5	5.2	218.7	876.7	131.2	1 007.9	1 226.5	1 208.8	2 435.3
July	1 260.5	509.6	18.1	1.5	19.7	148.1	49.8	197.9	217.6	408.0	625.6
August	1 137.3	646.2	26.8	1.7	28.6	450.3	40.4	490.7	519.3	212.4	731.7
September	993.2	802.8	50.3	2.3	52.6	453.5	51.2	504.7	557.4	144.8	702.2
Subtotal, 3rd quarter		1 958.6	95.3	5.5	100.9	1 051.9	141.4	1 193.3	1 294.2	765.2	2 059.4
October	1 048.5	808.6	20.9	1.8	22.7	218.0	53.0	270.9	293.6	197.7	491.3
November	1 330.2	696.2	12.6	1.7	14.3	179.7	51.0	230.7	245.0	180.6	425.6
December	1 615.5	549.4	15.1	1.7	16.9	371.5	52.5	424.0	440.9	196.9	637.8
Subtotal, 4th quarter		2 054.2	48.6	5.3	53.9	769.1	156.5	925.6	979.5	575.2	1 554.7
Total		9 193.4	426.0	23.1	449.1	3 744.5	583.6	4 328.1	4 777.3	3 489.2	8 266.4

Source: Potash and Phosphate Institute.

Note: Reported stocks at year-end total 1.51791 Mt.

**TABLE 4. CANADIAN POTASH, CURRENT SITUATION, 1989-98, AND FORECAST, 1999**

	Actual										Forecast <sup>1</sup>
	1989	1990	1991	1992	1993	1994	1995	1996	1997 <sup>r</sup>	1998 <sup>p</sup>	1999 <sup>e</sup>
(000 tonnes K <sub>2</sub> O)											
Capacity	12 045	12 045	12 045	12 180	12 180	12 235	13 220	13 310	13 400	13 410	13 410
Production	7 333	7 002	7 402	7 270	6 850	8 182	9 065	8 042	9 030	9 190	8 800
Capacity utilization (%)	61	58	61	60	56	67	69	60	67	69	66
Sales	7 124	7 190	7 056	7 025	6 863	8 517	8 635	7 970	9 510	8 265	9 000
of which: Domestic	315	396	350	370	356	385	345	355	490	450	450
United States	3 886	3 630	3 610	3 945	4 048	4 560	4 495	4 335	5 295	4 325	4 750
Offshore	2 923	3 164	3 096	2 710	2 459	3 535	3 795	3 280	3 725	3 490	3 800
Year-end stocks	1 596	1 272	1 585	1 785	1 726	1 285	1 545	1 420	935	1 520	1 300
World production	29 310	27 452	26 035	24 036	20 407	22 687	24 302	23 331	25 467	25 870	25 800
World capacity <sup>r</sup>	37 501	37 786	36 966	36 492	35 340	35 459	36 009	36 170	36 437	36 180	36 673
Canada/world											
Production ratio (%)	25.0	25.5	28.4	30.2	33.6	36.1	37.3	34.5	35.5	35.5	34.1
Capacity ratio (%)	32.1	31.9	32.6	33.4	34.5	34.5	36.7	36.8	36.8	37.1	36.6

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.

TABLE 5. CANADA, POTASH MINES, CAPACITY PROJECTIONS, 1990-2003

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
	(000 tonnes K <sub>2</sub> O)													
Agrium Inc. Vade (Vanscoy)	815	815	830	830	830	930	1 020	1 110	1 110	1 110	1 110	1 110	1 110	1 110
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 Central Canada Potash Inc., Colonsay	1 245	1 245	1 245	1 245	1 300	1 410	-	-	-	-	-	-	-	-
Subtotal	2 990	2 990	2 990	2 990	3 875	4 085	-	-	-	-	-	-	-	-
IMC Kalium <sup>2</sup> K1 and K2, Esterhazy (75%) Belle-Plaine Central Canada Potash Inc., Colonsay	-	-	-	-	-	-	1 745	1 745	1 745	1 745	1 745	1 745	1 745	1 745
Subtotal	-	-	-	-	-	-	4 085	4 085	4 085	4 085	4 175	4 405	4 665	4 765
Potash Company of America <sup>3</sup> Patience Lake	630	630	630	-	-	-	-	-	-	-	-	-	-	-
Potash Corporation of Saskatchewan Inc. Allan Cory Esterhazy (25%) Lanigan Patience Lake Rocanville	960 830 580 2 090 - 1 160	960 830 580 2 090 - 1 160	960 830 580 2 090 - 1 160	960 830 580 2 090 630 1 160	960 830 580 2 090 630 1 160	1 150 830 580 2 335 630 1 400	1 150 830 580 2 335 630 1 400	1 150 830 580 2 335 630 1 400	1 150 830 580 2 335 630 1 400	1 150 830 580 2 335 630 1 400	1 150 830 580 2 335 630 1 400	1 150 830 580 2 335 630 1 400	1 150 830 580 2 335 630 1 400	1 150 830 580 2 335 630 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
<b>Total Saskatchewan</b>	<b>10 885</b>	<b>10 885</b>	<b>10 900</b>	<b>10 900</b>	<b>10 955</b>	<b>11 940</b>	<b>12 030</b>	<b>12 120</b>	<b>12 120</b>	<b>12 120</b>	<b>12 120</b>	<b>12 440</b>	<b>12 700</b>	<b>12 800</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> Penobscis (Sussex)	380	380	470	-	-	-	-	-	-	-	-	-	-	-
Potash Corporation of Saskatchewan Inc. New Brunswick Division (Penobscis) Cassidy Lake Division (Cover Hill)	- - -	- - -	- - -	470 - -	470 - -	470 - -	470 - -	470 - -	470 - -	480 810 -	480 810 -	480 810 -	480 810 -	478 810 -
Subtotal	-	-	-	470	470	470	470	470	1 290	1 290	1 290	1 290	1 290	1 290
<b>Total New Brunswick</b>	<b>1 160</b>	<b>1 160</b>	<b>1 280</b>	<b>1 280</b>	<b>1 280</b>	<b>1 280</b>	<b>1 280</b>	<b>1 280</b>	<b>1 290</b>	<b>1 290</b>	<b>1 290</b>	<b>1 290</b>	<b>1 290</b>	<b>1 290</b>
<b>Total Canada</b>	<b>12 045</b>	<b>12 045</b>	<b>12 180</b>	<b>12 180</b>	<b>12 235</b>	<b>13 220</b>	<b>13 310</b>	<b>13 400</b>	<b>13 410</b>	<b>13 410</b>	<b>13 500</b>	<b>13 730</b>	<b>13 990</b>	<b>14 090</b>

Source: Natural Resources Canada.

- Nil.

1 Sold to Kalium Chemicals Company Limited in 1994. 2 IMC Global Inc. merged with Kalium Chemicals in 1996. 3 Sold to Potash Corporation of Saskatchewan Inc. in 1993. 4 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, 1993-98

	1993	1994	1995	1996	1997	1998 <sup>e</sup>
	(000 tonnes K <sub>2</sub> O)					
Brazil	173	242	223	234	272	315
Canada	6 850	8 182	9 065	8 044	9 029	9 190
Chile	35	52	52	179	235	280
China	60	90	171	150	186	170
C.I.S. <sup>1</sup>	4 667	5 112	5 605	5 395	6 650	6 915
France	890	870	802	751	665	420
Germany	2 860	3 286	3 278	3 334	3 423	3 585
Israel	1 309	1 259	1 326	1 500	1 488	1 670
Italy	-	-	-	-	-	-
Jordan	822	930	1 068	1 059	849	920
Spain	661	684	650	680	640	495
United Kingdom	555	580	582	618	565	610
United States	1 525	1 400	1 480	1 387	1 465	1 300 <sup>e</sup>
<b>Total</b>	<b>20 407</b>	<b>22 687</b>	<b>24 302</b>	<b>23 331</b>	<b>25 467</b>	<b>25 870</b>

Source: Natural Resources Canada.

- Nil; <sup>e</sup> estimated.<sup>1</sup> Russia and Belarus.