

UNDERSTANDING FERTILIZER IN THE WORLD

Fertilizer is the most important input for crops grown in Canada and around the world. Nitrogen(N), phosphorus (P) and potassium (K) fertilizers are globally traded commodities. Supply and demand are influenced by many factors that directly affect fertilizer markets in Canada and around the world.



WHERE DOES FERTILIZER COME FROM?

Nitrogen

Nitrogen is an element essential for plant growth. Nitrogen makes up about 78 percent of the air we breathe. In this form, it is inert and insoluble, meaning plants cannot use it directly. Fertilizer makers take nitrogen out of the air and combine it with hydrogen, generally from natural gas, to make the nitrogen compound ammonia.

Ammonia is used in two ways: it is applied directly in the soil as a nitrogen fertilizer, or it is used as a building block to make other nitrogen fertilizer products, including urea, ammonium nitrate, ammonium sulphate, and other water-based, liquid nitrogen fertilizers.

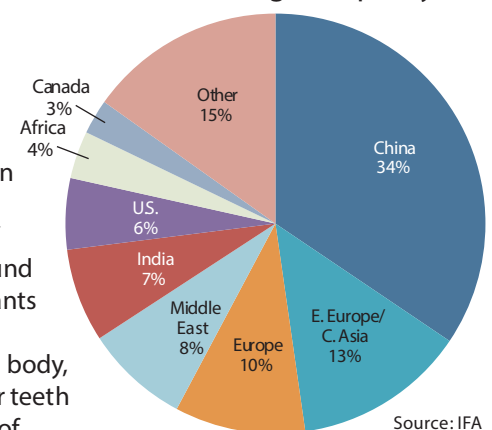
Canada produces less than three percent of the world's nitrogen fertilizer. Nitrogen fertilizer is manufactured at nine major facilities in Alberta, Saskatchewan, Manitoba, and Ontario. Canada makes more nitrogen fertilizer than Canadian farmers can use and more than half is exported. The cost of new production facilities can easily reach \$3 billion depending upon size and configuration.

Phosphate

Phosphorus is present in all living cells and is essential to all forms of life. It is present all around us, in the soil, rocks, plants and animals. Found throughout the human body, it is concentrated in our teeth and bones. The source of phosphorus in fertilizer is sedimentary phosphate rock, which is mined from the earth's crust.

Most of the world's phosphate production capacity is located in regions which have reserves of phosphate rock, the primary raw material. The largest reserves, close to forty percent of world supply, are found in Morocco. The United States, Russia and China are also major producers and exporters. Canada is not a significant producer and sources its supply mainly from the United States.

Global Nitrogen Capacity



Source: IFA

HOW DOES FERTILIZER MOVE?

Potash

Potassium is found throughout nature, and is essential to plant, animal and human life. It is found in the human body in muscles, skin and the digestive tract. Good health requires sufficient intake of potassium, and the plants we eat get it from potash. Crops grown for food require large amounts of potassium to support plant health and crop yields.

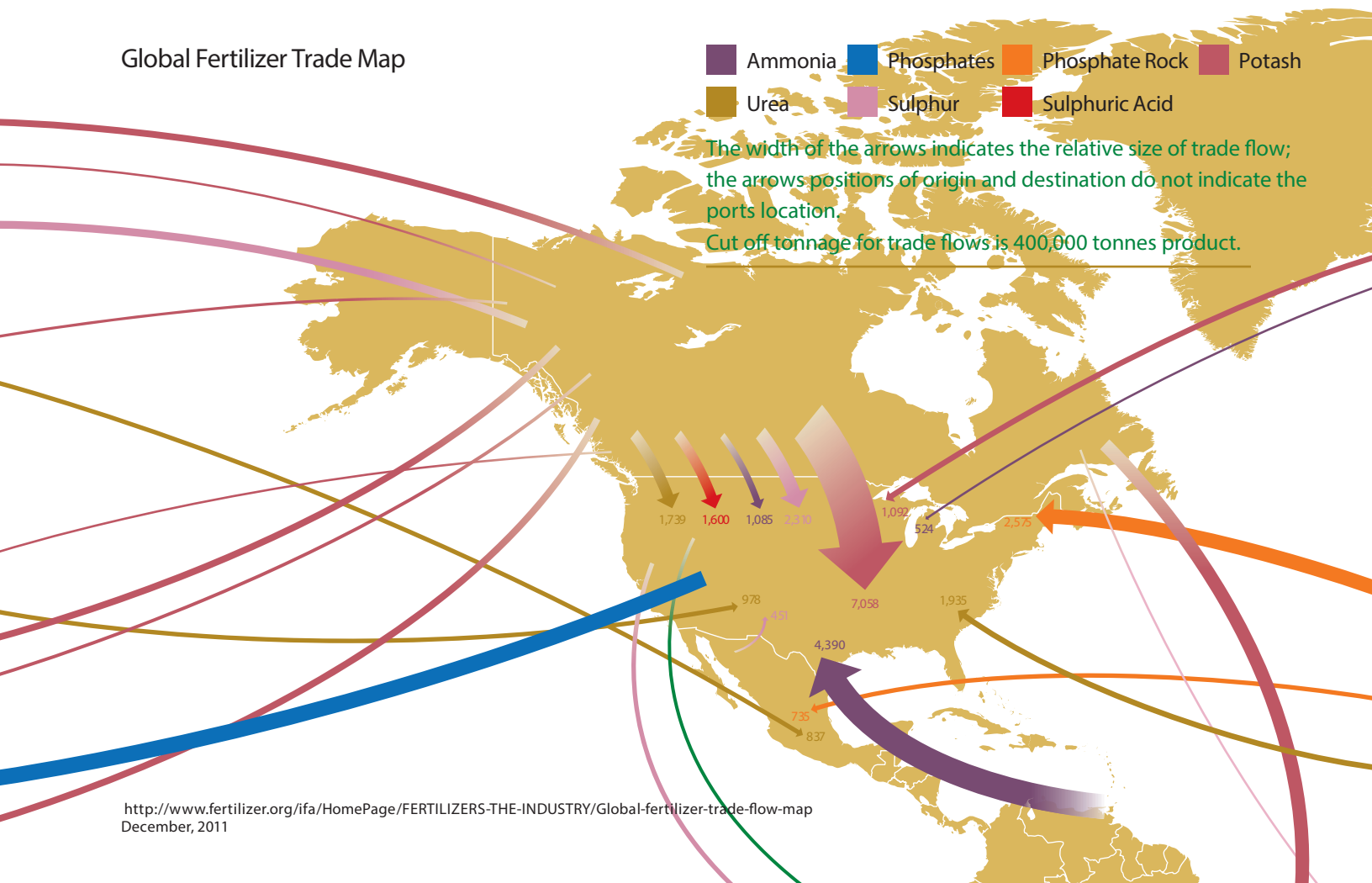
Plants use potassium in functions such as photosynthesis, protein formation, and water use. Potassium, or potash, is mined from naturally occurring ore bodies that were formed as seawater evaporated. The deposits are a mixture of crystals of potassium chloride and sodium chloride (salt). After it is mined, the potassium chloride is separated and results in a granular fertilizer.

Canada has the world's largest reserves of potash with the capacity to produce approximately thirty percent of world production. The largest deposits of potash are located in Saskatchewan and New Brunswick where the industry continues to expand production to meet the growing fertilizer needs of farmers around the world.

Transportation continues to be one of the more significant factors affecting fertilizer markets. Every year over 300 million tonnes of fertilizer must be moved by truck, train, barge and ship from production facilities to farm fields in every corner of the globe. Fertilizer production tends to be located near the key raw materials: natural deposits of phosphate and potash and natural gas fields required to make ammonia essential for nitrogen fertilizer production. Moving fertilizer around the world requires a complex global transportation and storage system, and logistics planning capable of adjusting for shifts in demand driven by weather and crop/food needs.

Globally, Nitrogen, Phosphate and Potash fertilizer are shipped to markets in response to demand from crop producers. Higher crop prices encourage farmers to increase planted acres and buy more fertilizer to improve yields. This increased demand for fertilizer tightens the fertilizer market. When crop prices fall, farmers tend to cut fertilizer use and that depresses the fertilizer market.

Global Fertilizer Trade Map



WHY DO WE NEED FERTILIZER?

This section discusses the four main factors that impact global demand.

- Soil and plant requirements
- Crop prices
- Global population
- Total seeded acres

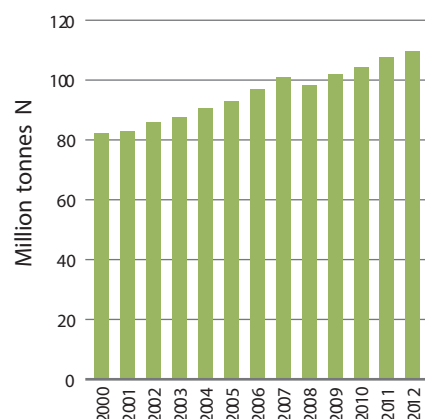
Soil and plant requirements

Plants require 17 essential nutrients in the soil to survive and to grow. Nitrogen, phosphorus and potassium are the three most important nutrients for high crop yields and sustainable food production. Soils in the main agricultural regions around the world supply these nutrients for crops, but over time nutrient levels will be depleted. Crops grown without adequate levels of nutrients results in reductions in soil quality, crop yield, and ultimately, food quality.

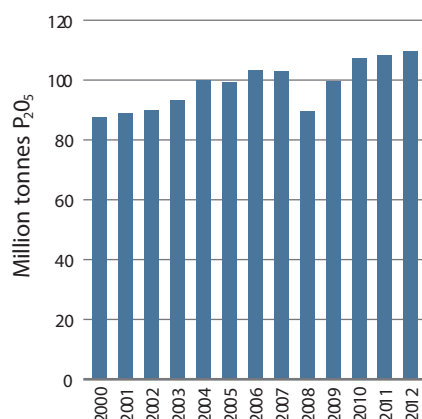
Regular soil testing determines the level of nutrients required. Growers use the 4R Nutrient Stewardship System (Right Source @ Right Rate, Right Time and the Right Place®) to determine nutrient management. This allows them to get the greatest economic return, reduce costs, build soil quality and minimize environmental impact.

Global Nutrient Demand Growth

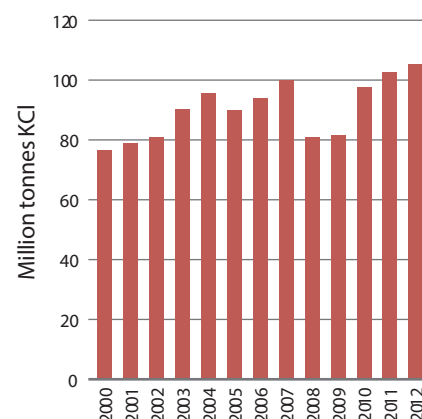
Nitrogen



Phosphate



Potash



Demand for NPK has been on a relatively steady rise since 2000.

Global population

Fertilizer demand is also impacted by a growing global population and a rising middle class willing to spend money on a healthy diet. The expanding world population also has a growing appetite for protein – requiring more livestock feed and additional demand for nutrient inputs. In a protein-hungry world, three to seven times the fertilizer is required to produce one kilogram of chicken, pork or beef protein compared to a kilogram of vegetable protein in grains.

As the global population continues to grow and reach an estimated nine billion by 2050, there is increasing pressure to feed the world. The best land for farming is already under production. Cutting down remaining forests would destroy critical habitats, damage the environment and increase greenhouse gas emissions. These population dynamics put additional pressure on crops, crop prices and the demand for fertilizer.

Crop prices

Drought and our growing global population are two significant factors that impact crop prices. Higher crop prices have a direct impact on fertilizer demand, as growers strive to increase crop area and yields when crop prices are higher. While there are many factors that contribute to higher crop yields, adding the right amount of fertilizer to the crop is one of the most direct ways to increase crop yields.



Total seeded acres

The final major driver for global fertilizer demand is the amount of crop acres seeded. A number of factors, affect the number of acres seeded to cropland – crop prices, government policies, weather, etc. Global grains and oilseed production continues to increase.

As the need to produce more on each unit of land increases, fertilizer demand will increase. Growers are encouraged to develop sound risk management strategies to prepare for changes in crop and nutrient prices. Agri-retailers and crop advisors are good sources of information and can provide advice on fertilizer markets before the growing season.

Canadian farmers only use about two percent of all fertilizer used around the world each year.



FREQUENTLY ASKED QUESTIONS

Q. Does the price of natural gas affect fertilizer prices?

A. Fertilizer markets are driven by global supply and demand factors. Farmer demand and available supplies of fertilizers around the world are key factors. The underlying reason for increased fertilizer demand is income growth in developing countries, which results in better diets and changes in food preferences and, in turn, higher demand of agricultural products. South and East Asia and Latin America are key regions where fertilizer use and demand are rising.

Q. How do grain prices affect demand for fertilizer?

A. The price of grain and fertilizer demand are strongly linked. When the price of grain goes up, fertilizer is in higher demand. It can take years for new fertilizer facilities to be built, so supply sometimes lags demand and fertilizer markets also tighten up.

Q. Is Canada a significant player in the world fertilizer market?

A. Canada is the world's largest producer and exporter of potash fertilizer and a significant net exporter of nitrogen fertilizer. Canadian farmers are highly productive and buy about \$3.5 billion worth of fertilizer products each year. But that is just a fraction of the total fertilizer used by farmers around the globe each year. For phosphate, Canada produces just one percent of world supply and is a net importer.

Canada has the world's largest reserves of potash with the capacity to produce approximately 34 percent of world production.

The Canadian Fertilizer Institute (CFI) represents manufacturers, wholesale and retail distributors of nitrogen, phosphate and potash fertilizers – an industry that contributes more than \$12 billion annually to the Canadian economy. CFI is the unified voice of Canada's fertilizer industry with a mandate to promote safe, responsible and sustainable, globally competitive fertilizer production, distribution and use.

Visit www.cfi.ca for more information.



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