

Sustainability

Nutrient Management



Just like humans require the proper nutrients to grow healthy and strong, so do plants. Fertilizer is the food plants need to produce a healthy crop. As plants grow, they extract these important nutrients from the soil. When the crop is harvested, much of the nutrients from the soil are as well. Therefore, farmers must replenish the soil's nitrogen, phosphate and potash after each harvest.

Corn, like all plants, is dependent on three macro-nutrients: nitrogen, phosphorus and potassium. On average, the earth's soil contains approximately 20 percent of the nutrients food production requires (Fertile-minds.org). Conventional fertilizers and use of animal manure make up the difference, most notably in nitrogen, phosphorus and potassium. Neither these macro-nutrients or fertilizer are chemicals, yet are commonly mistaken as such. Actually, these are naturally occurring elements present in nature. However, they are seldom in a form readily consumable for plants, so nutrient suppliers harvest them from nature and put them in a form usable for plants (Nutrients for Life Foundation).

The Macro-nutrients of Nitrogen, Phosphorus and Potassium

Plant growth and chlorophyll production need nitrogen, the most used nutrient for corn and many other crops, and the building block for many fertilizers. Nitrogen makes up approximately 78 percent of the atmosphere and is renewable and sustainable.

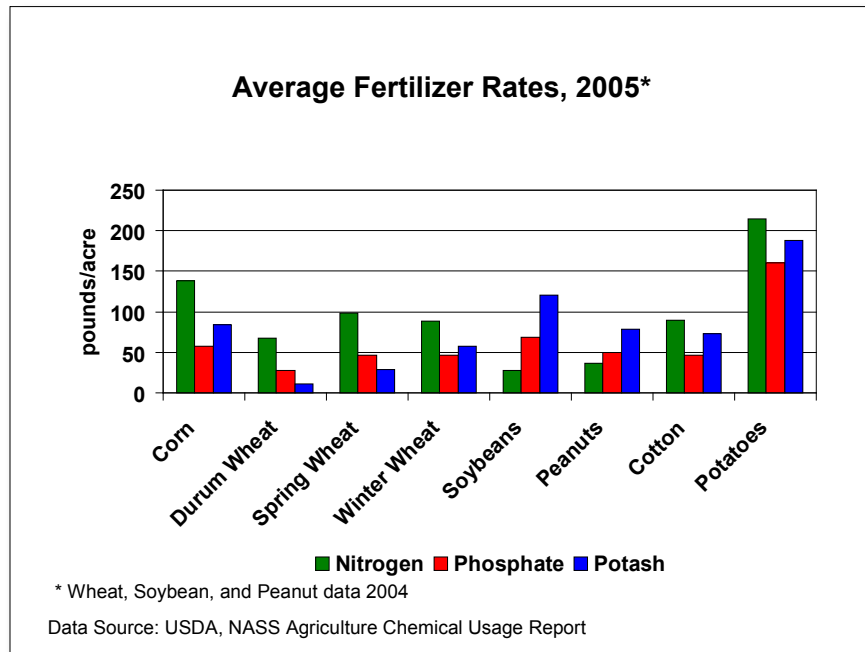
Plant root uptake is dependent on an adequate supply of soil phosphorus/phosphate. Phosphorus is involved in seed germination and helps plants use water efficiently. Phosphorus occurs in natural geological deposits that can be found plentifully in the United States and elsewhere in the world.

Potassium, the seventh most abundant element in the earth's crust, protects plants from cold winter temperatures and helps them resist invasion by weeds and insects. Potassium is necessary to stop wilting, help roots stay in place and assists in transferring food. It filters into oceans and seas through natural processes and is left as mineral deposits as these bodies of water eventually evaporate.

Corn, for example, is incapable of fixing atmospheric nitrogen in the way leguminous plants such as soybeans, peanuts and alfalfa can. Therefore, corn must take up this nutrient through the soil.

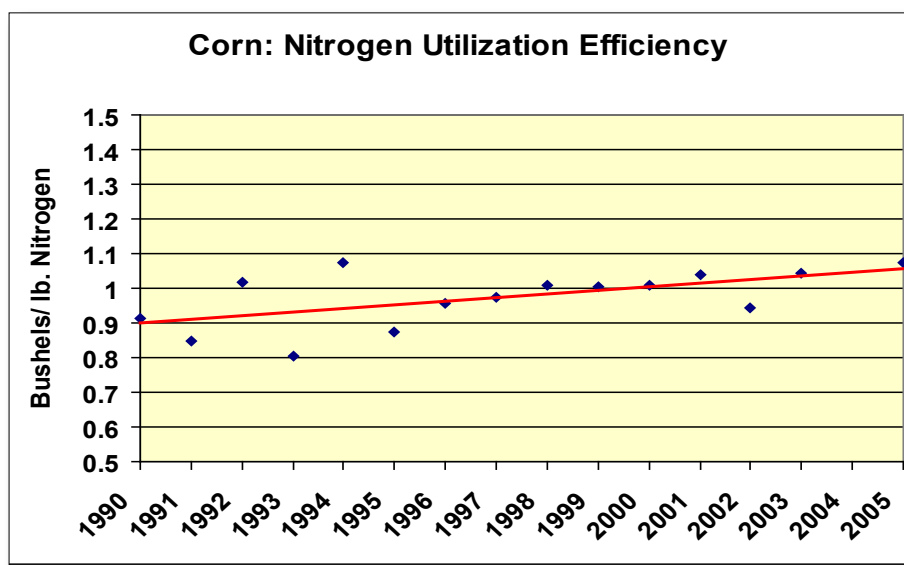
Since the introduction of the use of conventional fertilizers in the mid 20th century, America's corn farmers have adopted the technology to produce a safe and reliable crop to meet global food, feed and fuel demands. Dr. Norman Borlaug, a Nobel Prize Laureate, has calculated that in America alone, an additional 450 million acres of farmland would be required to maintain our current food production without fertilizer (Nutrients for Life Foundation).

Increasing fertilizer costs, environmental concerns and changing agronomic practices are accelerating farm nutrient management efficiencies. Nutrient management is a conservation practice that involves proper timing and placement of the right amounts of nutrients and soil amendments for adequate soil fertility and to minimize potential environmental degradation, particularly water quality. Farmers adopt nutrient management plans to increase fertilizer use efficiencies.



The latest advances in agriculture technology enable farmers to apply fertilizers with pinpoint accuracy, minimizing their impact to soil, water and air. For example, the use of enhanced efficiency fertilizers, such as slow- and controlled-release fertilizers and stabilized nitrogen fertilizers, are helping to protect the environment by reducing nutrient losses and improving nutrient efficiency while also improving crop yields.

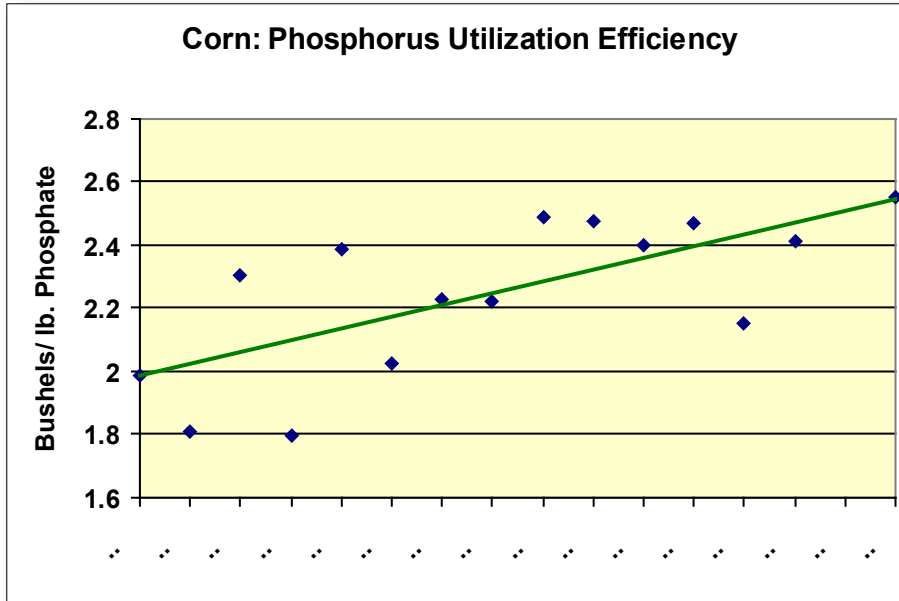
One of the clearest measures of sustainable agriculture production is increasing efficiency, with the ability to swell output while decreasing inputs. According to USDA, growers use less nitrogen to produce more than 50 percent more corn than was produced in 1980. Furthermore, during the past 15 years, farmers have experienced an increase in nitrogen efficiency, which means less nutrients are being lost to runoff.



* 2004 data estimated

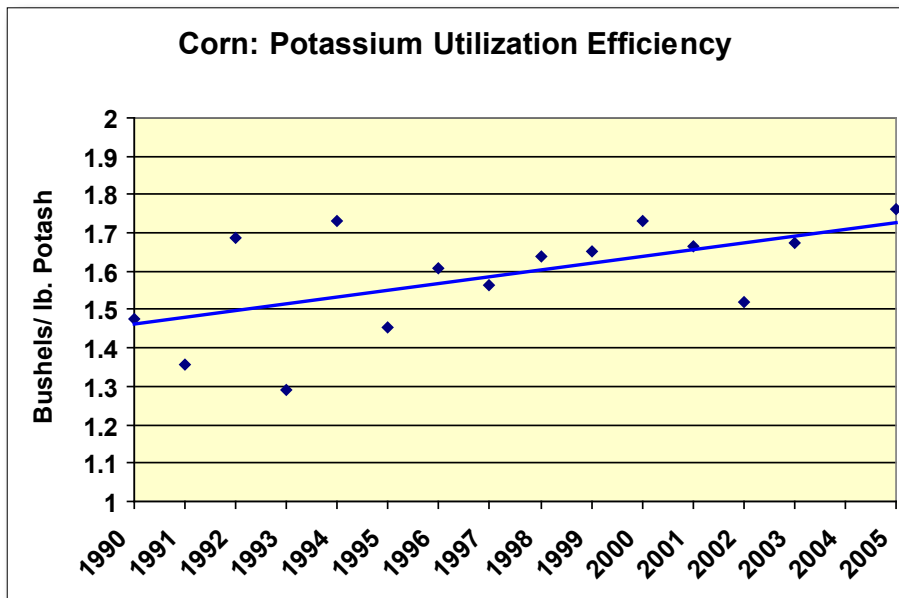
Data Source: USDA, NASS "Agricultural Chemical Usage Report"

Early in the next decade, life sciences companies are expected to introduce corn hybrids containing biotechnology traits designed to further increase corn nitrogen utilization efficiency as well as corn phosphorus utilization efficiency and corn potassium utilization efficiency.



* 2004 data estimated

Data Source: USDA, NASS "Agricultural Chemical Usage Report"



* 2004 data estimated

Data Source: USDA, NASS "Agricultural Chemical Usage Report"

Key Points:

- Fertilizer is the food plants need to produce a healthy crop and replaces the soil nutrients used in crop production.
- Corn, like all plants, is dependent on three macro-nutrients: nitrogen, phosphorus and potassium. All three macro-nutrients must be replaced after each harvest.
- These three macro-nutrients are natural elements present in our environment, but aren't easily consumable by plants. Therefore, the nutrients are harvested from nature and put into a usable form for plants.
- Nutrient management is a conservation practice that involves proper timing and placement of the right amounts of nutrients and soil amendments for adequate soil fertility and to minimize potential environmental degradation, particularly water quality.
- The latest advances in agriculture technology enable farmers to apply fertilizers with pinpoint accuracy, minimizing their impact to soil, water and air.

Works Cited

Fertile-minds.org "Fertilizer Fundamentals." 12 May 2007.

< http://www.fertile-minds.org/q_and_a/fundamentals/index.php>

Nutrients for Life Foundation. "Fertilizer Facts." 12 May 2007. <<http://www.nutrientsforlife.org/index.htm>>