Illinois Fertilizer & Chemical Association
Supply · Service · Stewardship

FERTILIZER'S ROLE in WORLD FOOD PRODUCTION

The Fertilizer Institute
Nourish, Replenish, Grow

The issue of escalating food prices

has emerged as a serious global issue with

social, political & economic

implications.

Hunger and political instability often go hand-in-hand, and reports of food riots in Asia and elsewhere in the world are a reminder that feeding the world is of critical importance. The factors that have created the food crisis are multiple and complex, including higher global prices for energy. One of the necessary components in the solution is the use of fertilizer to further increase the efficient and environmentally sensitive and responsible production of food for the world.

At the heart of the food price issue is the first ever demand-driven food cycle in modern times, including the world's increased demand for more diverse diets. Food demand has outstripped the world's ability to increase food supplies resulting in a rapid rise in food prices and local food shortages. Each year, the world's population grows by 80 million individuals and millions of new consumers are becoming wealthy enough to switch, not just from rice to meat based diets, but also to diets that are rich in fruits and vegetables.

Today, the world's grain stocks to use ratio is at its lowest level in 35 years. In eight of the last nine years since 2000, global consumption of grains and oilseeds has exceeded production. We are simply not growing enough food to keep up with world demand. If the world's farmers stopped growing food today, we would only have enough grains in the world's storage bins to feed the world's population for 58 days*.

"This is a basic problem, to feed 6.6 billion people. Without chemical fertilizer, forget it. The game is over."

Dr. Norman Borlaug | Nobel Peace Prize Winner

** As of June 17, 2008.*

Fertilizer is a precious resource,

which plays a critical role in world food production & is a necessary part of solving today's global food crisis.

Just to keep up with food demand, we need record global crop production every year.

Fertilizers are currently responsible for between 40 and 60 percent of the world's food supply. Fertilizer's major nutrients – nitrogen, phosphorus and potassium – are elements that occur naturally in the environment. Fertilizers replenish our soils in harvest after harvest to promote healthy and abundant crops for food production. Those nutrients are removed with the harvested crop and help provide nutritional value to the foods we eat. These nutrients must be replaced to ensure each year's crop grows a nutritious supply of food.

The United Nations Food and Agriculture Organization (FAO) estimates that the total world demand for agricultural products will be 60 percent higher in 2030 than it is today. FAO projects that more than 85 percent of this additional demand will come from developing countries.

The world's options for increasing food production are limited both by the supply of land and water. Either we must place more of the world's land under cultivation, increase yields on existing acres, or both. According to the United Nations, there were over 3.5 billion acres of arable land worldwide in 2005. Increasing world population, among other factors, limits any significant expansion of global arable acres. While expansion of acreage is expected to increase in South American countries like Brazil and Argentina, arable land is shrinking elsewhere. For example, China alone lost over 100,000 acres of arable land in 2007 and over a million acres of U.S. agricultural land are lost to development uses each year.

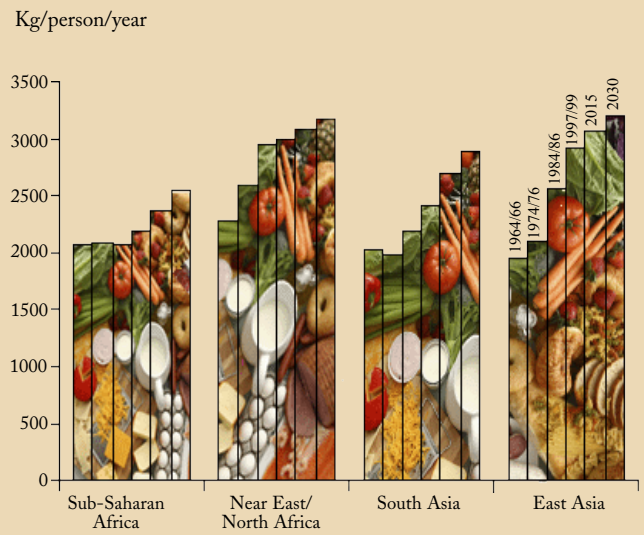
For over half a century, the world has relied on increasing crop yields to supply an ever increasing demand for food. According to U.S. Department of Agriculture data, total world grain production (corn, oats, barley, sorghum, wheat and rice) rose from 0.905 billion metric tons in 1965 to 2.091 billion metric tons in 2007.

Meanwhile, total harvested area of world grains, which accounts for nearly half of all arable land, is up only 4.3 percent from its 1965 level and down 6.8 percent from the peak of 1.814 billion acres in 1981. This dramatic increase in world grain production was the result of a 122 percent increase in crop yields.

In order to increase world food production in a sustainable manner, farmers will need to use the right fertilizer at the right rate, right time and right place.

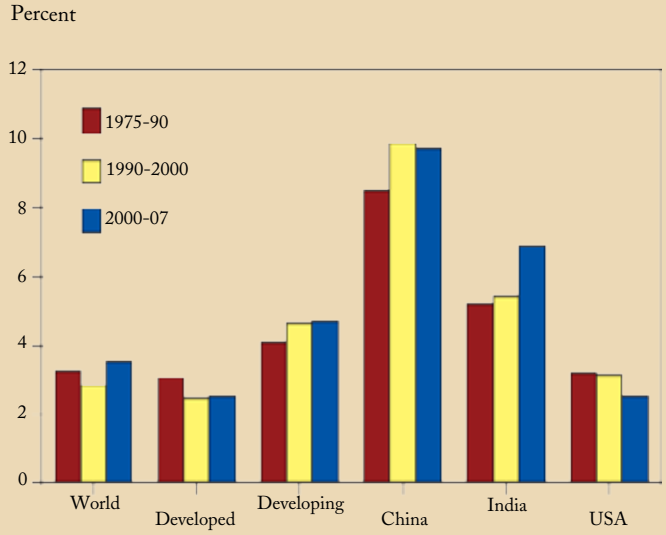
We are faced with the first demand-driven food cycle in modern times.

Changes in Total Food Consumption



SOURCE: UNITED NATIONS FOOD AND AGRICULTURE ORGANIZATION

Strong Economic Growth: Average Real GDP Growth Rates



SOURCE: U.S. DEPARTMENT OF AGRICULTURE

The nutrients from fertilizers are necessary for

crop growth & an adequate fertilizer supply is an integral part of every nation's food security.

Fertilizer is a Strategic Commodity

Each bushel of corn, wheat and soybeans needs the nutrients provided by commercial fertilizers. These nutrients are also necessary for meat production. Production of a pound of beef requires 7 pounds of feed and every pound of pork produced requires 4 pounds of feed.

Fertilizers are natural resource-based products. Nitrogen fertilizer is produced by capturing nitrogen from the air using a complex chemical reaction. Nitrogen is currently produced in over 80 countries worldwide. The primary raw material for nitrogen production is natural gas, but nitrogen can also be produced from coal, fuel oil and naphtha.

The production of phosphate and potash fertilizers begins at the mine. The manufacture of phosphate requires phosphate rock and sulfur. Phosphate rock reserves have been identified in 32 countries worldwide, but the economic extraction of the rock is limited to fewer countries, as the top three producing countries account for 63 percent of total world production while the top 12 account for 93 percent.

Potash ore reserves have been identified in 21 countries worldwide. Currently, the economic extraction of potash is limited to only 12 countries. Consequently, most countries have to rely on imports to meet demand. Potash is imported by more than 100 countries worldwide as over 80 percent of world potash production is exported.

The United States is the largest importer of fertilizer in the world, with more than half our nitrogen and nearly 90 percent of our potash supplies coming from international sources.

NITROGEN (N)

is a primary building block for all organisms. It is essential to making proteins, helps keep plants green and is a critical component of soil structure.

COMES FROM THE AIR

PHOSPHORUS (P)

is found in every living cell. Phosphorus is a component of DNA and it also plays vital roles in capturing light during photosynthesis, helping with seed germination, and helping plants use water efficiently. Plants also use phosphorus to help fight external stress and prevent disease.

COMES FROM ANCIENT SEA LIFE

POTASSIUM (K)

is essential to the workings of every living cell. It plays an important role in plants' water utilization and also helps regulate the rate of photosynthesis. Other aspects of plant health influenced by potassium include the growth of strong stalks, protection from extreme temperatures, and the ability to fight stress and pests such as weeds and insects.

COMES FROM EVAPORATED OCEANS

Feeding the World Requires New Research

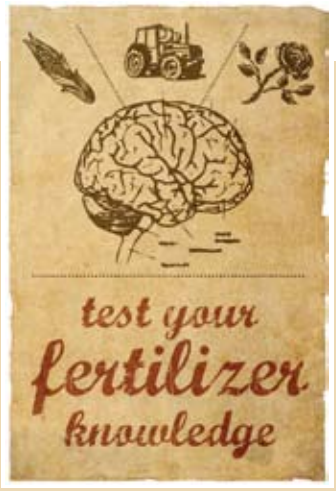
The world has experienced a 30 year "drought" of underinvestment in agriculture. If the world's farmers are to reach their full potential, public and privately funded research must focus on improving crop yields through increased fertilizer nutrient use efficiency. Through its support of the International Plant Nutrition Institute (IPNI), the fertilizer industry is currently supporting over 130 research projects worldwide that continue to feed new scientific information into cropping systems to better enable those systems to use the right fertilizer nutrients applied at the right rate, right time and right place and sustainably increase crop yields and food quality.

The industry remains committed to minimizing agriculture's environmental footprint. The use of best management practices such as the application of the right product at the right rate, right time and right place is a crucial part of this effort. However, these strategies will only be effective in meeting the intensifying challenge of increased world food demand if there is a recapitalization of production-oriented agriculture research initiatives.

Feeding the World Requires Free Markets

The recent food crisis has led some governments to engage in trade distorting practices that have exacerbated the current food crisis. Government bans on exports of rice from China, India, Cambodia and Egypt are fueling food riots and disrupting global food trade patterns. Additionally, actions such as the implementation of China's high export tax on fertilizers, which ranges from 100 to 135 percent and is designed to keep fertilizer in the country for domestic use, create additional challenges to the world's food production system.

The fertilizer industry is partnering with stakeholders to help farmers overcome local social and economic challenges and implement science-based best management practices. Unencumbered by artificial trade barriers, the world's farmers will step up to today's most critical challenge and produce an abundant supply of food for the world primarily through the appropriate application of chemical fertilizers.



1 WHAT ARE THE TOP FIVE FERTILIZER NUTRIENT CONSUMING COUNTRIES IN THE WORLD?

China, India, the United States, Brazil and Pakistan, respectively.

2 WHAT ARE THE TOP FIVE FERTILIZER NUTRIENT IMPORTING COUNTRIES IN THE WORLD?

The United States, China, Brazil, India and France, respectively.

3 WHAT ARE THE TOP FIVE FERTILIZER NUTRIENT PRODUCING COUNTRIES IN THE WORLD?

China, the United States, Russia, Canada, and India, respectively.

4 WHAT ARE THE TOP FIVE FERTILIZER NUTRIENT EXPORTING COUNTRIES IN THE WORLD?

Russia, Canada, the United States, Belarus, and Germany, respectively.

5 WHICH COUNTRIES ARE THE WORLD'S TOP FOOD PRODUCERS?

The United States leads the world in corn and soybean production and China leads the world in wheat and rice production.

6 CAN FERTILIZER HELP AFRICAN AGRICULTURE?

Fertilizer use in Sub Saharan Africa is the world's lowest, at less than 8 kg per hectare. As stated by the International Fertilizer Development Center, "No country has been able to expand agricultural growth rates and eliminate hunger without increasing fertilizer use."

7 WHAT ABOUT U.S. CONSUMPTION OF FERTILIZERS?

U.S. Department of Agriculture data shows that farmers today are using fertilizer nutrients with the greatest efficiency in history. Between 1980 and 2005, U.S. corn production increased by 74 percent. In the same timeframe, farmers' adoption of best fertilization practices, including placement near roots and timing of application, improved consumption efficiency. Use of nitrogen on corn increased by only 3 percent while use of phosphate and potash fertilizers fell by 20 and 24 percent, respectively.

8 HOW MUCH HAS THE RISING PRICE OF FERTILIZER IMPACTED THE COST OF FOOD IN THE UNITED STATES?

Despite dramatically rising prices, the cost of fertilizers still only represents a fraction of the cost of producing food. Fertilizer is only 2 percent of the cost of producing a loaf of bread and is 3 percent or less of the consumer price for chicken, beef and pork.

9 DID YOU KNOW?

- According to a recently released report published by the World Bank, global food prices increased by 83 percent between February of 2005 and February of 2008.
- More than one-half of the fertilizer used in China is used to grow fruits and vegetables.

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