



U.S. CORN GROWERS: Producing Food and Fuel



With more than 120 operating biorefineries and dozens more under construction, the U.S. ethanol industry is booming. As a result of rapid capacity expansion over the past several years, the amount of corn used for ethanol production is increasing dramatically. In fact, corn use for ethanol tripled from 2001 to 2006 and the U.S. Department of Agriculture estimates 3.4 billion bushels of corn will be made into ethanol in 2007/08.



Accelerated growth in corn use for ethanol has led critics to question the industry's ability to satisfy demand for both renewable fuels and traditional markets like livestock and poultry feed, food processing and exports. Skeptics suggest the corn industry will face difficulty in meeting demand and growers will experience a dilemma of whether to supply customers in the feed, food and export markets or to supply the burgeoning ethanol industry. Many have also alleged competing uses for grains will drive corn prices—and, in turn, retail food prices—to abnormally high levels. This contrived “food versus fuel” argument is fraught with misguided logic, hyperbole and scare tactics.



Detractors argue that grain markets should adhere to a hierarchical approach that emphasizes grain's utility as food and feed. But what about the fundamental societal needs of energy, security and mobility? Aren't those needs interconnected with the basic need of nourishment? And if the U.S. agriculture sector has the technology and ingenuity to impact all of those needs, shouldn't it aspire to do so?



As opposed to ranking the demands on grain, a comprehensive view of agriculture's role in meeting the essential needs of tomorrow should be considered. The corn industry will continue to strive to satisfy a variety of important demands and maximize the utility of its product. Seed technology developments, increasing agricultural efficiency, innovation in biofuels production processes and other breakthroughs will ensure the American farmer will continue to meet the world's needs for food, feed, fuel and other uses.

This paper examines the “food versus fuel” fallacy and provides accurate information and verifiable data to refute the notion that corn growers will face an “either-or” dilemma when marketing their grain. As they have done for decades, U.S. corn growers will continue to be reliable suppliers of both **food AND fuel**.

Record Demand for Corn is Being Met with Record Supplies

Demand for corn is at an all-time high, due in large part to the rapid increase in corn-based ethanol production. But what is often overlooked is the fact that supply is keeping adequate pace with demand. In response to heightened demand, U.S. growers have produced the four largest corn crops in history in the past four years. Annual production averaged 10.89 billion bushels from 2003/2004 to 2006/2007, compared with an average of 9.45 billion bushels in the previous four crop years. Given normal weather conditions and trend yields in 2007, corn producers will harvest a record crop of approximately 13 billion bushels. Data from ProExporter Network suggests that while total corn demand in 2007/08 will be about 900 million bushels higher than in 2006/07, total supply will be about 1.6 billion bushels higher. Simply put, though the market may experience more volatility as demand rapidly increases, there is **no shortage of corn**.

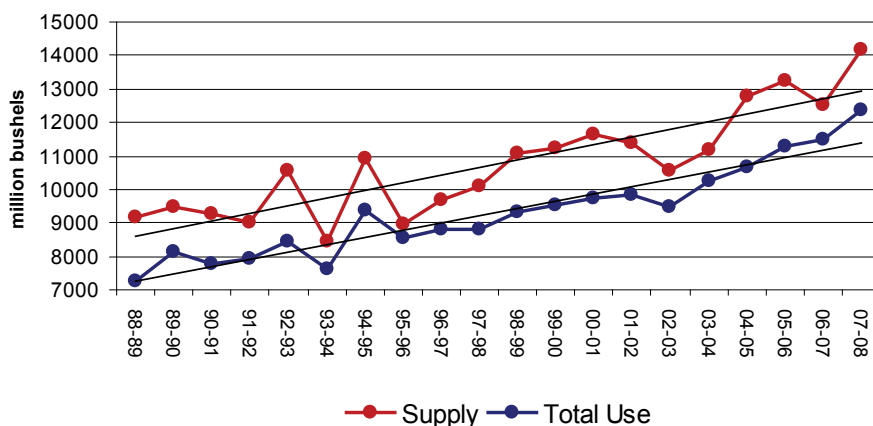
"Don't underestimate the ability of U.S. and global agriculture to respond to higher prices."

—USDA Chief Economist Keith Collins¹

"...as you look at the effect of molecular breeding, instead of getting that one bushel-per-acre rate of gain each year, you get two or three. As you look at the biotechnology traits, particularly drought and fertilizer efficiency, we think that it's possible to see those national averages push 250 to 300 bushels per acre."

—Robb Fraley, Monsanto vice president and chief technology officer²

U.S. Corn Supply & Total Use, 88-89 to 07-08

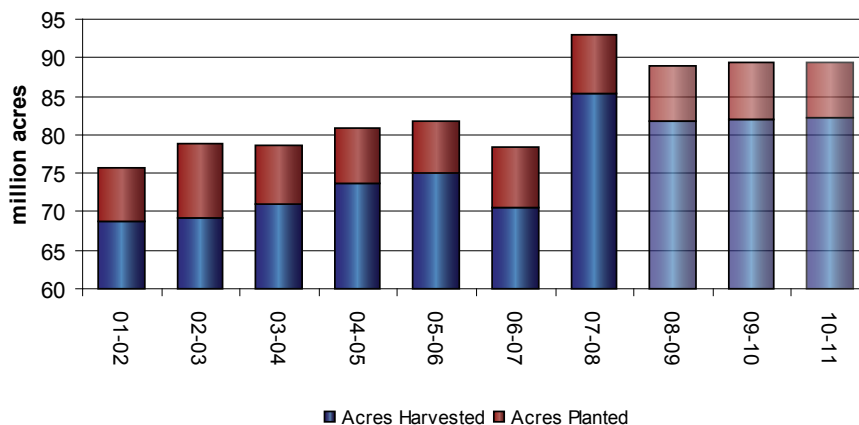


Source: USDA, ERS; ProExporter Network

Note: 07-08 is based on ProExporter Network projections

Corn growers make their planting decisions based on signals from the marketplace. If demand for corn is high and projected revenue-per-acre is strong relative to other crops, farmers will plant more corn. That is exactly what happened in 2007, as higher-than-normal corn prices prompted farmers to plant 92.9 million acres to corn, a 19 percent increase over 2006 and the highest level since 1944.

U.S. Corn Acres, 01-02 to 10-11

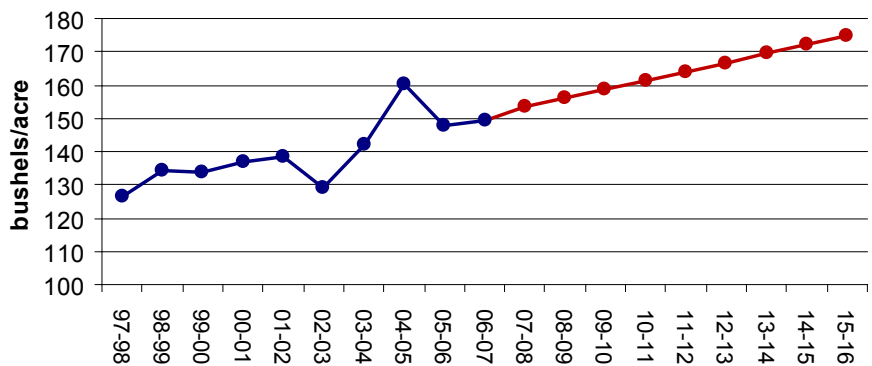


Source: USDA, ERS; ProExporter Network

Note: 08-09 to 10-11 are based on ProExporter Network projections

Furthermore, increasing yield per acre will ensure there continues to be an adequate supply of corn for all markets in the future. On average, corn yields have increased by about three bushels per acre per year since the 1995-1996 crop year. Based on the 10-year historical trend, corn yield could reach 175 bushels per acre by 2015/16. Corn yields could advance at an even faster rate than indicated by the 10-year trend because of improved plant breeding practices and biotechnology.

U.S. Corn Yield, 10-Year History and Trend

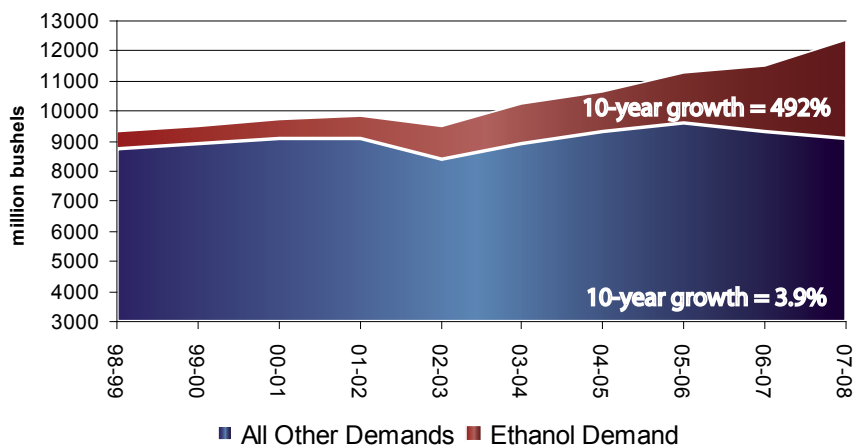


Source: USDA, ERS; NCGA

Corn Demand for Food and Feed is Plateauing

Because other corn demand categories show signs of only limited future growth, it is expected that most of the additional supply resulting from expanded acreage and higher yields will be available for biofuels production. Demand for corn in the livestock and poultry sector has been relatively flat in the last 10 marketing years. The amount of corn fed to livestock is expected to decline slightly going forward, as more corn is displaced from feed rations by distillers grains. Furthermore, the amount of corn used for human food processing has been flat, and corn exports have trended up only slightly.

Ethanol Use vs. All Other Corn Uses



Source: USDA, ERS; ProExporter Network
 Note: 07-08 Demand Figures from ProExporter Network; growth is absolute, 98-99 to 07-08

“The development of new technologies, combined with yield improvements, point to the opportunity to produce more food and more fuel—and not just in this country but throughout the world.”

—Patricia Woertz,
 chairman and CEO
 of Archer-Daniels-
 Midland³

“Feeding wet distillers grains saves us 25 cents per day per cow. We won’t switch our grain ration for a nickel or dime, but a quarter savings is big. I believe it’s the best byproduct feed to come along. And we’ve tried them all.”

—Missouri Dairy Farmer
 Mark Chamberlin⁴

Ethanol is Produced from Field Corn, Not Sweet Corn

Some purveyors of the “food versus fuel” argument seem to forget that ethanol is made from field corn, a grain that is undigestible by humans in its raw form. Unlike sweet corn, field corn requires some form of processing before it can be consumed by humans. Moreover, very little field corn is actually used for human food ingredient processing. As an example, just 1.5 percent of the 2006/07 crop was used for cereals, while other human food uses accounted for roughly 9 percent of total corn use. The overwhelming majority of U.S. corn, including exports, feeds livestock—not humans.

“Our concern has been ‘Will there be enough feed?’ Assuming all the distiller’s grains are available for livestock feed, clearly there will be.”

—Dr. Jim MacDonald, Texas A & M Experiment Station beef cattle nutritionist.⁵

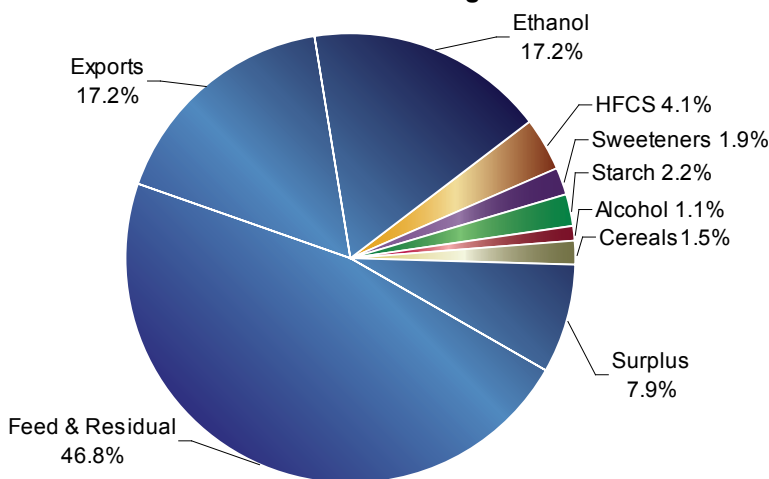
“Claims on higher consumer food prices in the popular press are exaggerated...Energy prices and increasing retail margins are competing explanations for the rising food prices.”

—John Beghin, economist at the Food and Agriculture Policy Research Institute at Iowa State University⁶

“While it may be more sensational to lay blame for rising food costs on corn prices, the facts don’t support that conclusion. By a factor of two-to-one, energy prices are the chief factor determining what American families pay at the grocery store.”

—Economist John Urbanchuk, LECG, LLC⁷

2006/07 U.S. Corn Usage



Source: USDA, ERS; Feed Outlook, June 13, 2007

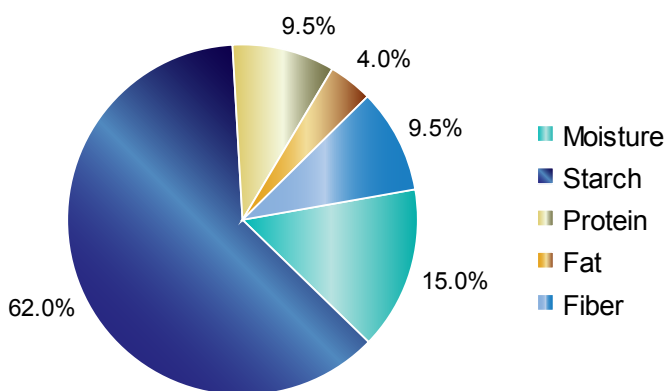
Note: Percentages based on Total Supply

The Ethanol Process Creates Feed and Food Ingredients

Ethanol isn’t the only product created by the fuel alcohol fermentation process. Every 56-pound bushel of corn used in the dry grind ethanol process yields 18 pounds of distillers grains, a good source of **energy** and **protein** for livestock and poultry. Similarly, a bushel of corn in the wet mill ethanol process creates 13.5 pounds of corn gluten feed and 2.6 pounds of high-protein corn gluten meal, as well as corn oil used in food processing.

The ethanol process removes only starch—**not fat or protein**—from the feed and food market. The starch portion of the kernel is converted to ethanol, while the protein, fat and other nutrients, vitamins and minerals are passed through to the feed coproducts or human food ingredients. Protein, which is left intact by the ethanol process, is a highly valued product in world food and feed markets. Conversely, starch is abundantly available and lower in value. Aside from preserving the protein, a considerable portion of the corn’s original digestible energy is also preserved in the distillers grains.

Components of Yellow Dent Corn



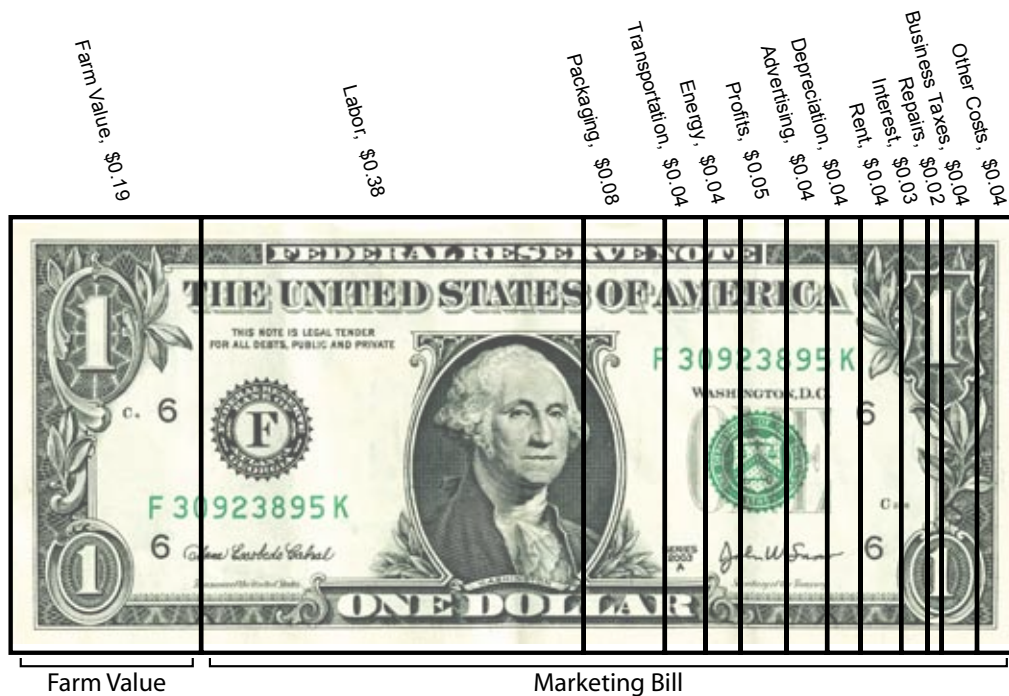
Source: Corn Chemistry and Technology, 1999

Note: Wet Weight

In 2006/07, more than 12 million metric tons of distillers grains were produced by ethanol plants and fed to livestock and poultry. It is estimated that distillers grains displaced more than 500 million bushels of corn from feed rations last year, allowing that corn to be used in other markets.

Corn Demand for Ethanol has No Noticeable Impact on Retail Food Prices

A central theme in the “food versus fuel” myth is the false assertion that moderately higher corn prices, spurred by ethanol demand, are leading to higher retail food prices for consumers. The facts show this argument simply doesn’t hold water. Numerous cost factors contribute to retail food prices. According to USDA, labor costs account for 38 cents of every dollar a consumer spends on food. Packaging, transportation, energy, advertising and profits account for 24 cents of the consumer food dollar. In fact, just 19 cents of every consumer dollar can be attributed to the actual cost of food inputs like grains and oilseeds.



Source: USDA's Economic Research Service

Retail food products such as cereals, snack foods, and beverages sweetened with corn sweeteners contain very little corn. Therefore, fluctuations in the price of corn are not often reflected in the retail prices for these items. As an example, a standard box of corn flakes contains approximately 10 ounces of corn, or about 1/90th of a bushel. Even when corn is priced at \$4 per bushel, a box of corn flakes contains less than a nickel's worth of corn.

Corn is a more significant ingredient for meat, dairy, and egg production. However, corn still represents a relatively small share of these products from a retail price perspective. As an example, it takes about 3.6 pounds of corn to produce one pound of pork (live weight). This equates to 22.5 cents worth of corn when corn is \$3.50 per bushel, compared to 16 cents worth when corn is \$2.50.

"If you have to single out the... greatest contributor to higher prices it is energy. Fuel contributes costs to food at every step: growing, processing, packaging and shipping. Higher energy costs also drive up the overhead for grocers, restaurants and warehouses."

—Ed Maxiner, editor of the *Kiplinger Agricultural Letter*⁸

"There has been a lot of inaccurate information out there about corn prices and alternative energy and it just keeps getting reported... Feed is such a small part of the overall (retail food) price that it really isn't a driver."

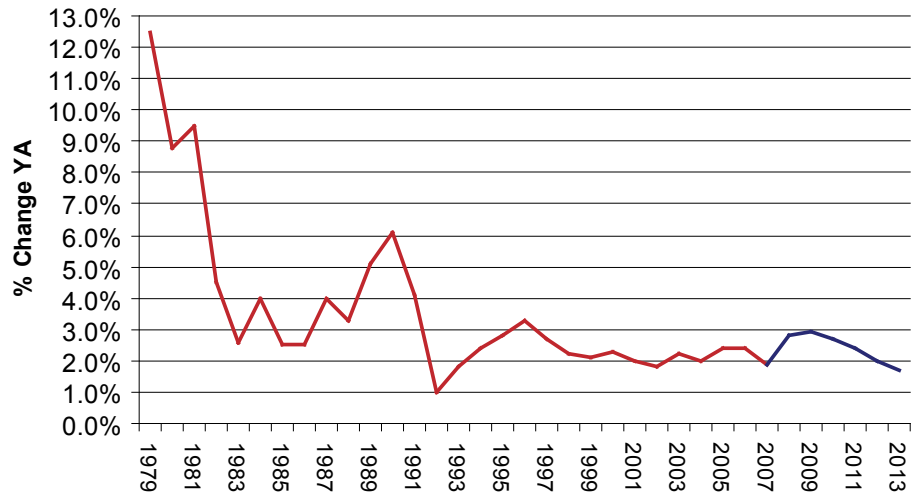
—Ephraim Leibtag, economist with USDA's Economic Research Service⁹

"The consumers should complain to The Organization of the Petroleum Exporting Countries (OPEC) and not to the farmer if they're unhappy with food prices. The U.S. regularly encounters food inflation even when corn and soybean prices are low or falling. Retailers and food processors typically put an extra markup on top of any increase in commodity prices."

—Michael Swanson, Wells Fargo agricultural economist¹⁰

Because corn and other grains constitute such a small portion of retail food products, moderately higher grains prices are unlikely to have any noticeable impact on overall food inflation. According to USDA, annual food inflation for the next five years is likely to closely follow the 25-year annual average (1982-2006) of just 2.9 percent. This compares to an average annual food inflation rate of 8.9 percent between 1972 and 1981.

Consumer Price Index for Food (% Change from Year Ago)



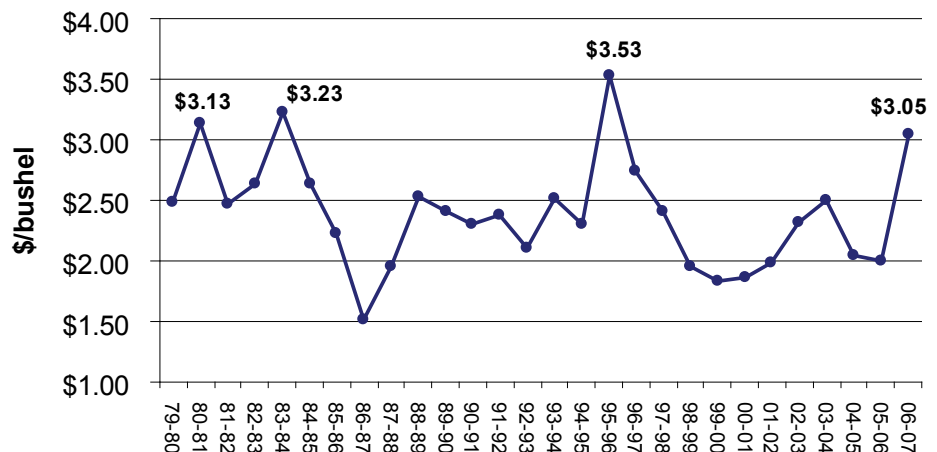
Source: USDA, ERS Agricultural Projections to 2016 (Feb. 2007)

Other cost factors are much more influential in determining the retail price for food products. A June 2007 study by LECG, LLC, determined energy prices have twice the impact on retail food prices that grain prices do. The study concluded that historically high energy prices are a much more significant factor in the marginal increases in food prices in 2007.

Current Corn Prices are Not Unprecedented or Unmanageable

Strong demand in the 2006/07 marketing year led corn prices to average \$3.05 per bushel, the highest season average since 1995/96. While current corn prices are indeed higher than they've been in recent years, they are not unprecedented or unmanageable for customers. And a yearly average of \$3.05 is a far cry from the "\$4 per bushel" level that is frequently cited by biofuel critics. To put recent corn prices in perspective, consider that farm-gate yearly corn prices have averaged more than \$3.10 per bushel three other times in the past 30 years.

U.S. Farm Price for Corn, 79-80 to 06-07



Source: USDA, ERS
Note: 06-07 price is midpoint price from June 2007 WASDE

"Corn is on the road to meet the demands for biofuels, the strong export demand and so ... we should see better profitability for the ethanol industry and for the livestock industry."

—David Lehman, the managing director and chief economist for the Chicago Board of Trade

"...feed costs are not part of the formula that determines the price of milk, so there's no direct way for dairy farmers to pass on their costs to bottlers and consumers."

—Sacramento Bee reporter Jim Downing paraphrasing the opinions of four dairy experts¹²

Because corn prices have been historically low in the past decade, recent prices seem disproportionately higher. A February 2007 study by economists at Tufts University found that below-cost feed allowed the broiler chicken industry to save \$11.25 billion and the integrated hog industry to save \$8.5 billion in costs between 1997 and 2005.

Higher corn prices have not affected livestock and poultry producers to the degree that some would lead us to believe. Strong global demand for meat and dairy products has led to healthy earnings in recent months for meat and milk producers, despite higher feed costs. As an example, milk prices received by farmers increased 52 percent from July 2006 to May 2007. Milk prices received by farmers in May 2007 were the highest they've been since June 2004. And according to a June 2007 edition of Chicago Mercantile Exchange's Daily Livestock Report, "...pork producers are likely in the best financial shape ever..." Certain meat and poultry cuts are also enjoying record prices at the wholesale level as well. Chicken leg quarters, for instance, achieved a record price of \$50.43/cwt in late June 2007.

It is also important to remember meat, dairy, and egg producers will eventually make production adjustments in response to higher feed costs and changing market conditions. The result of these cyclical adjustments is often an increase in farm price for those commodities, which allows the producer to remain profitable.

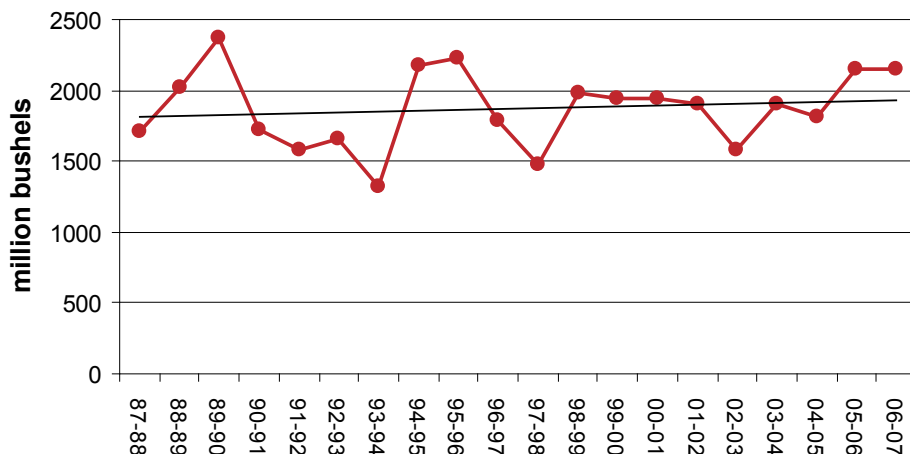
One of the most significant and immediate benefits of higher grain prices is a dramatic reduction in federal farm support payments. According to USDA, corn farmers received \$8.8 billion in government support in 2006. Because of higher corn prices, payments are expected to drop to \$2.1 billion in 2007, a 76 percent reduction. As USDA Chief Economist Keith Collins told Business Week magazine, "All the price-dependent spending is getting wiped out."

Increased Production Allows Corn Growers to Satisfy Both Domestic and International Demands

Even as corn use for ethanol has risen dramatically in the past 10 years, American farmers have continued to satisfy all demands for U.S. corn from foreign customers. U.S. corn growers continue to serve proudly as the world's top exporter of corn.

The ethanol sector is also helping to satisfy foreign demand for high-protein, high-energy feedstuffs by exporting large amounts of distillers grains annually. The United States exported more than 1.25 million metric tons of distillers grains to countries around the world in 2006. As government data clearly shows, increased demand for corn in the ethanol sector has not caused a downturn in exports. *(Continued on page 8)*

U.S. Corn Exports, 87-88 to 06-07



Source: USDA, ERS

"We used to say that high corn prices were good for the hog business in the long-term, good for hog prices. I still think that's true today."

—Charles Grassley, U.S. Senator from Iowa, the nation's top pork-producing state¹³

"...the price impact on livestock products will likely be relatively small in comparison to the change in corn prices."

—Iowa State University Ag Economist Chad Hart¹⁴



Continued from page 7

In the emotion of the “food versus fuel” issue, there is a popular misconception that U.S. corn exports are used to feed humans in malnourished countries across the globe and that ethanol use will diminish exports to these countries. The truth is the majority of corn exports from the United States are used to feed livestock in developed countries.

Another fact that is often lost in this debate is that there is more food per capita today on a global scale than ever before, according to the Food and Agriculture Organization of the United Nations. Lack of infrastructure, access to capital, and other issues are the more likely causes of hunger—not scarcity of food.

Additionally, higher global grain prices and the development of a world biofuels trade are allowing small farmers in many parts of the world to earn a profit on their crops for the first time in years. Speaking to the Reuters news service, Gustavo Best, chief energy policy analyst at the United Nations’ Food and Agriculture Organization (FAO), said, “If well managed, bioenergy production can bring new areas of development ... new investment, new jobs and new infrastructure that can also benefit the food industry.”

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