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## Corn — The Raw Material of South Dakota's Past, Present and Future

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Stop right now and look around. No matter where you are, you're probably looking at the benefits of corn — even if you're miles from the nearest field.

Skeptical? When you shower, brush your teeth, ride in vehicles and wear clothing, you undoubtedly benefit from corn every day. Soap, toothpaste, tires, ethanol and textiles are just a few of the hundreds of non-food products made using corn.

While you may not think much about cornfields and combines every day, without them your world would take a dramatic turn. **Today, agriculture is South Dakota's biggest industry, creating \$21.3 billion in economic impact that touches every corner of the state and every one of its 750,000 residents.** That's more than \$28,000 in economic benefit for every man, woman and child in South Dakota from agriculture *alone*.<sup>1</sup>

And if you think farming only benefits rural America, then your concept of agriculture is decades out of date. Without the super-efficient work of South Dakota's farmers, thousands of non-ag jobs would disappear, America would be *more* dependent on foreign oil, and we'd all pay much more for food, fuel and hundreds of everyday products.

**Powering our state's number one industry are South Dakota corn growers, arguably among the most productive people in world history.** Harvesting yields that would have seemed like science fiction just a generation earlier, American farmers grow an incredible 500 percent more corn than they did in 1930 — on 20 percent less land, according to the U.S. Department of Agriculture.

*American farmers grow 500 percent more corn  
than they did in 1930 — on 20 percent less land.*

**What does that mean for you? Jobs, economic activity, lower gas prices and the cheapest food in history:**

- Every year South Dakota corn producers harvest a nearly 600-million-bushel crop that sends more than \$6.7 billion rippling through the state's economy.
- Thanks to the productivity of the farmer, Americans today spend a lower percentage of their disposable income on food than ever before.
- Corn-based ethanol reduces the cost of gasoline by up to 40 cents per gallon.<sup>2</sup>

What's more, dramatic improvements in seed and production methods make farming more eco-friendly than ever. A study of historical crop yield and nitrogen use data shows farmers today raise about 70 percent more corn per pound of fertilizer than just 35 years ago.<sup>3</sup>

**Corn isn't just a means to making a living, nor is it only a food for livestock.** Generations of economic evolution have revealed corn as the raw material of South Dakota's past, present and future.

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## Harvesting Mountains of Gold — Corn's Amazing Evolution

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When it comes to fueling the economy by getting more and more out of every acre, corn producers lead the way.

While the composition of corn today (starch, protein, oil and fiber) is about the same as its ancient Mexican ancestors, incredible genetic and technological advances have made modern corn a distant, scientifically nerdy cousin to the early settlers' maize.

*Corn yields per acre in South Dakota more than doubled between 1988 and 2008.*

### Powered by Productivity Motive

Farming is a lifestyle, but it's also a business. Driven by productivity motive and national policy that emphasized affordable food, South Dakota farmers have led an incredible transformation of agriculture.

Science long ago unlocked the genetic code of corn, allowing global seed technology companies to engineer a more productive plant. Meanwhile, agricultural equipment manufacturers have spent decades creating increasingly efficient machines. South Dakota farmers have balanced it all, turning the seed and machinery scientific double play into incredible productivity.





## Growing by 300% — or More

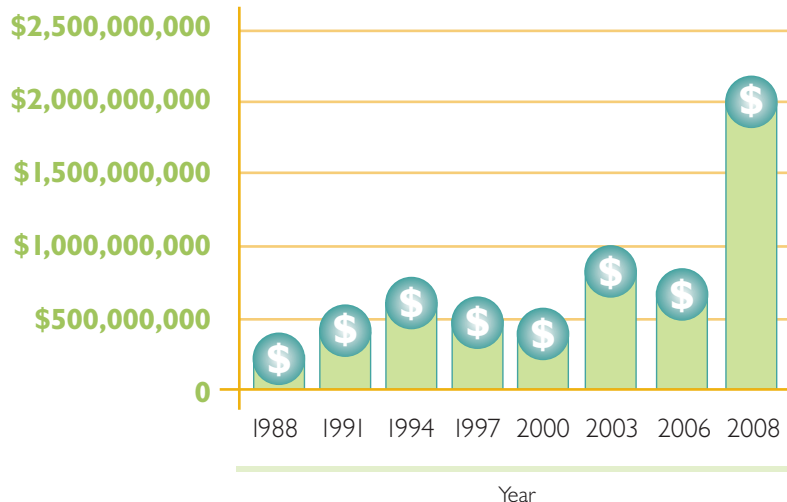
In 1988, South Dakota farmers harvested 132 million bushels from 2.4 million acres for an average yield of 55 bushels per acre. In 2008 — just 20 years later — South Dakota farmers harvested 585 million bushels of corn from 4.4 million acres for an average yield of 133 bushels per acre, according to USDA statistics.

That's a 343 percent increase in total harvest and 141 percent increase in yield per acre in just a generation, with national corn trade groups projecting yields per acre to **double** again in the next generation (25 years).

The value of that South Dakota corn harvest has posted equally stunning gains, increasing 515 percent from \$314 million in 1988 to \$2.1 billion in 2008.<sup>4</sup>

No matter how you harvest the data, South Dakota farmers have posted bin-busting productivity gains — with no sign of slowing up any time soon.

## South Dakota Value of Production



Source: U.S. Dept. of Agriculture, National Agricultural Statistics Service



## South Dakota Corn Planted & Harvested



Source: U.S. Dept. of Agriculture, National Agricultural Statistics Service



## Farming — The Original Sustainable Industry

Not only is corn the renewable fuel that's powered the human food chain for centuries, it's also making American products greener by the year.

While most South Dakota businesses find green practices both financially and socially beneficial, for farming, resource conservation has always been a business life-or-death issue.

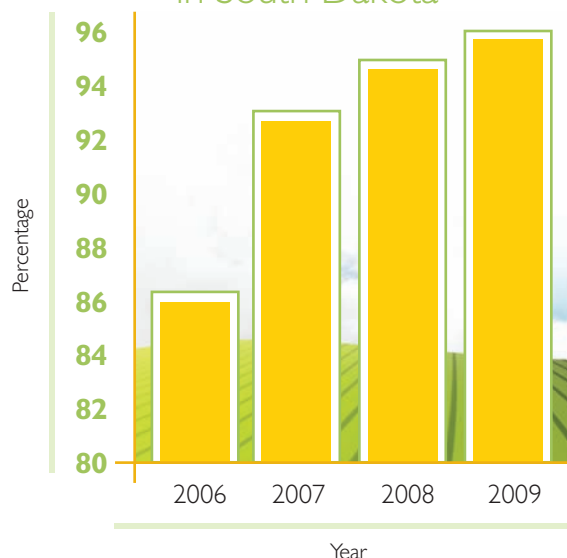
American farmers know that it's not good enough to harvest 150 bushels per acre just once. In order to stay in business they have to make substantial yields sustainable year after year.

### Biotech: The Proven Safe Way to Fight Hunger

Much of the ability to deliver ever-growing yields has been created by biotech, genetically modified or so-called "high tech" corn plants. By enhancing genes in the corn plant, bioscientists have dramatically increased its resistance to yield-limiting factors.

Given the ubiquitous nature of corn in the American food supply, undoubtedly every American has consumed biotech corn repeatedly in his or her lifetime. In light of the hunger-fighting benefits of high-yielding biotech corn, lack of adverse impact in the U.S. and exhaustive international research, a study done by The Monsanto Company claims more than 25 Nobel Prize winners and 3,400 prominent scientists have expressed their support for the advantages of genetically modified foods and crops as a "powerful and safe" way to improve agriculture and the environment.<sup>5</sup>

### Percentage of Biotech Acreage in South Dakota



Source: U.S. Dept. of Agriculture, National Agricultural Statistics Service







With the price of fertilizer and other inputs getting higher and higher, and the constant pressure to increase yields, focusing on sustainable use of our land is not only the right thing to do, it's just smart business.

*Gary Duffly*

Oldham, South Dakota



## The Seeds of a Green Revolution

The American farmer's ability to do more with less — the fundamental premise of conservation — starts with seed corn. Driven by competition for farmers' business, scientists have succeeded in engineering seeds that have built-in resistance to yield-sapping damage from insects, weeds and diseases. Those traits also help reduce the use of pesticides.

Today's corn is engineered to absorb costly fertilizer more readily, helping farmers get more bushels per pound of fertilizer than ever before. Seed technologists are making progress against the biggest yield limiter of all — drought.

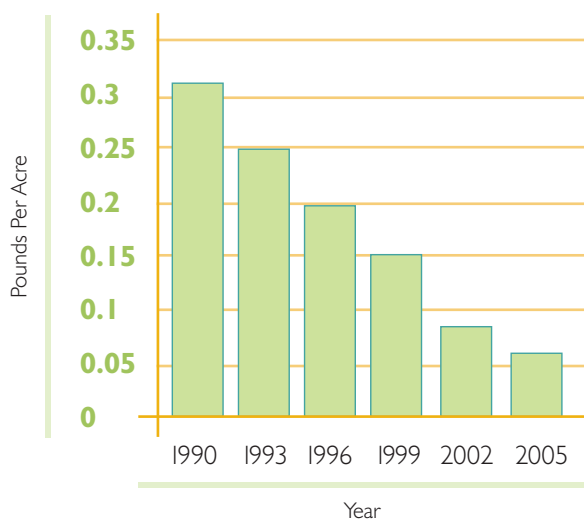
Economics and environmental concerns also intersect to encourage farmers to adapt to practices like reduced- or no-till planting methods, lowering both the cost in fuel and time to work fields and decreasing soil erosion.

*Reduced tillage and other farm management practices have decreased soil erosion 43 percent in 20 years.<sup>3</sup>*

## Using Every Part and Replacing Barrels of Petroleum

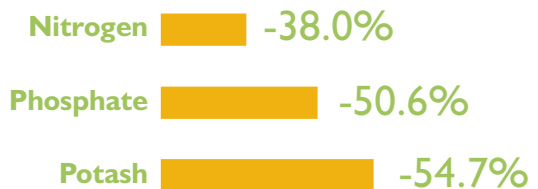
Adding to corn's green appeal is its incredible versatility. There is virtually no waste from a kernel of corn. Every part of the kernel — starch, protein, oil and fiber — is used to make thousands of products from corn chips to cosmetics and from paper to plastics. In many cases, economically priced corn has replaced expensive petroleum used to create products, making even American landfills much greener places.

### U.S. Insecticide Use Trends



Source: U.S. Dept. of Agriculture

### U.S. Nutrient Use: 1980–2005



% Change in Pounds/Bushel

Source: The Fertilizer Institute

# Enough Corn to Meet the Challenge of Food *and* Fuel

## Super-productive farming saves you money at the grocery store and gas station.

In the 1970s, American agriculture policy changed. Rather than paying farmers not to produce, policy shifted to minimizing the price Americans pay for food by encouraging development of the ample harvests we have today.

## The Most Affordable Food in History

One of the biggest beneficiaries of this new food policy has been the American pocketbook. Next time you're about to complain about the price of food, stop and think about this:

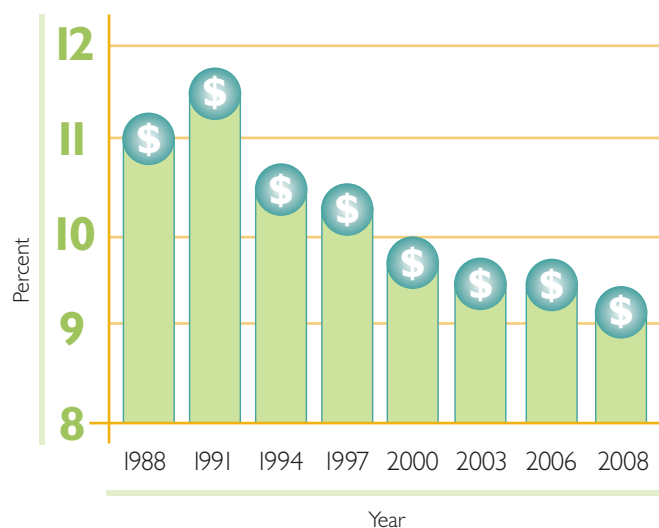
**In 2008, Americans spent just 9.6 percent of their disposable income on food (including dining out), the lowest percentage ever.<sup>6</sup>**

In 1929, the actual price of food was far less, but American incomes were much lower as well. As a result, a 1929 family spent 23.4 percent of their disposable income on food, more than double the percentage we spend today.<sup>6</sup>

By global standards, American food is an even better deal. Households in less-developed countries like India often spend 50 percent of their income on food. Even countries in Europe spend more than twice what U.S. consumers spend.

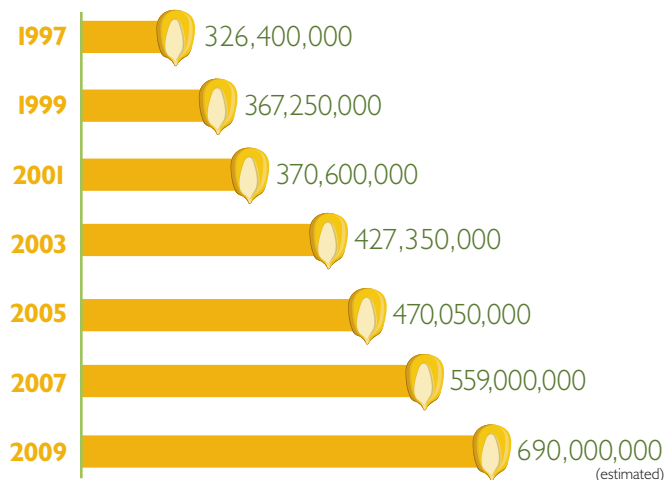
Who should you thank for your relatively inexpensive food bill? American farmers in general and corn producers in particular. Because it's by far the largest crop in America, and inexpensive corn translates into affordable food.

## Percent of U.S. Income Spent on Food



Source: U.S. Dept. of Agriculture

## South Dakota Corn Production (bushels)



Source: U.S. Dept. of Agriculture







Without ethanol to pick up the excess production, farms would be growing something else — storage bins.

With both food and fuel creating markets for our corn, the message is loud and clear — you grow it, we'll use it. So we're going to grow it.

Having both food and fuel as customers for our corn has really taken the productivity handcuffs off farmers. Most of us are excited by the challenge to produce.

*Darvin Ihnen*

Hurley, South Dakota

## Sweet Corn or Field Corn—You Still Eat It

The whole-kernel corn that shows up on your plate — from a can, freezer bag or on the cob — is sweet corn, which represents only about one percent of the crop. Virtually all the corn you see in fields around South Dakota is field corn (sometimes called dent corn), a very hard form of corn that is practically inedible to humans in kernel form.

But humans do eventually consume about 60 percent of the nation's corn crop. Fifteen percent of our national corn crop is fed to livestock according to the USDA, and livestock is consumed in the human food chain. Another 10 percent of the crop nationally is used for other food purposes, like high-fructose corn syrup, an inexpensive and plentiful sweetener favored by processors.

In 2008, about 75 percent of the crop was either used in the food chain to make other products or exported.<sup>4</sup> So what happened to the other 25 percent?

## Ethanol — Saving You Even More Money

Something to think about next time you fill up your tank ...

**Studies show that without ethanol, Americans would pay about 20 to 40 cents *more* per gallon of gasoline.<sup>2</sup>**

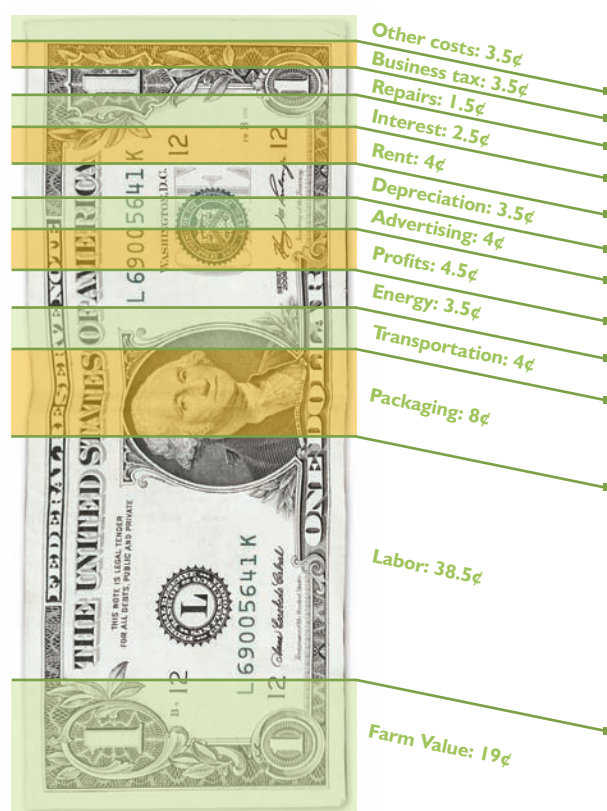
Why? Because American ethanol production reduces the demand for oil by well over 300 million barrels a year. It's supply-and-demand — by decreasing the demand for oil, ethanol decreases the price of gasoline. Ethanol is also cheaper than gasoline, so creating a blend of 90 percent gasoline, 10 percent ethanol (the most commonly used ethanol blend) also reduces the price per gallon.

South Dakotans benefit even more directly from ethanol. The state's 16 ethanol plants consumed 291 million bushels of corn in 2009, about half of the state's entire corn crop.<sup>7</sup> That corn investment created an estimated 33 direct jobs in ethanol plants and an estimated \$120 million in wealth that rolled around the South Dakota economy according to estimates from the South Dakota Corn Utilization Council.

## Meeting Every Demand with Some to Spare

Even with all the food, fuel and product demands on the corn supply, the USDA reports that American farmers met the demand — *with a billion bushels left over*. In 2008, South Dakota produced an excess of 66 million bushels after all uses — including exports — were satisfied. That's enough to feed all of our livestock for nine months.<sup>3, 7</sup>

Only 19 cents of every dollar can be attributed to the actual cost of food inputs, such as grains and oilseeds. The remaining 81 cents factors in labor, transportation, packaging and energy.

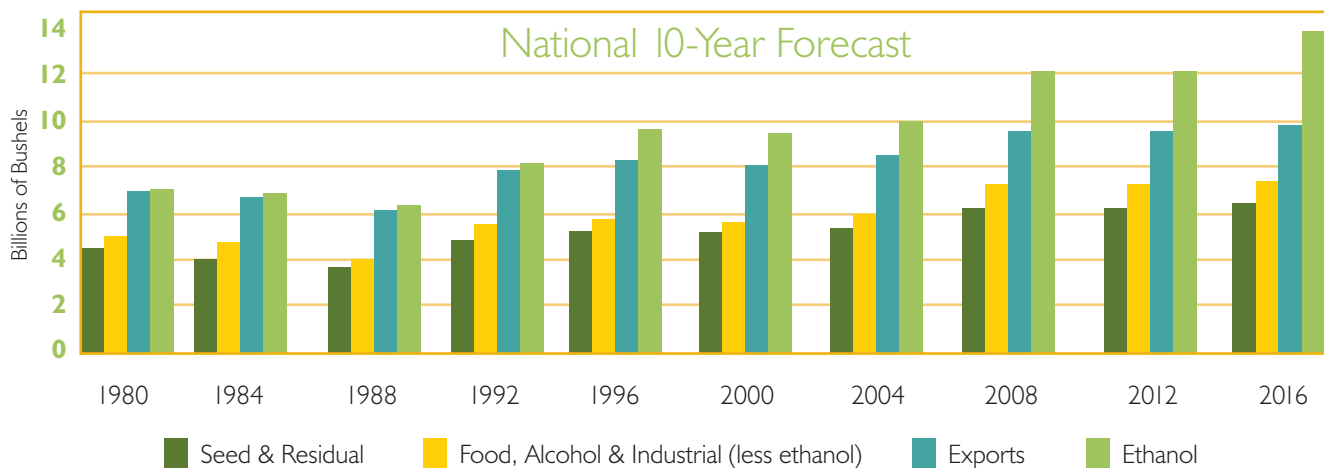


Source: U.S. Dept. of Agriculture, Economic Research Service

# Will There Always Be Enough Corn To Go Around?

Corn is big in South Dakota and the rest of the country, and it's only going to get bigger.

As science advances and corn finds its way into much more than livestock — it's already in things like lipstick, batteries, antibiotics, leather tanning, rubber, biodegradable plastics and much more — the concern has shifted from "What do we do with it all?" to "Will we have enough?" The simple answer is yes.

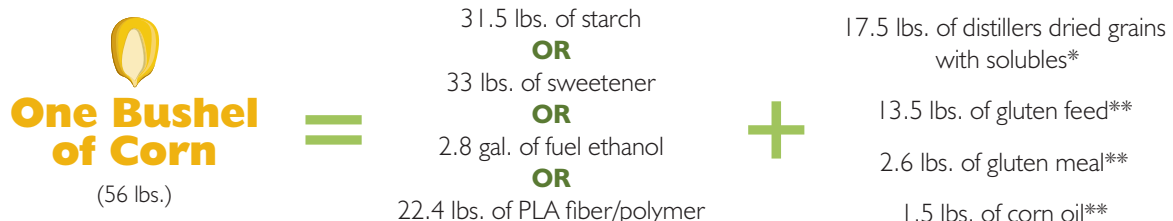


## Meeting the Growing Demand

Whenever people consider the future supply and demand of corn — especially how it will impact consumers' wallets — they often make the mistake of comparing future demand to current supply.

The fact is that while corn supply has grown incredibly in the last generation, the USDA forecasts call for the national corn crop to increase by about three billion bushels (25 percent) in the next eight years.

## The Forecast: Enough Corn for All Users



\*In dry grind ethanol process.

\*\*In wet mill ethanol process. Gluten feed is 20 percent protein, and gluten meal is 60 percent protein.

Source: National Corn Growers Association









When it comes to meeting a productivity challenge,  
I wouldn't bet against the American farmer.

A lot of us feel a real sense of duty to provide the  
harvests that continue to meet the growing demands  
in South Dakota and around the world.

Corn is becoming the raw material for more and  
more non-food uses. We're excited to produce a  
sustainable, American-made crop that is used in so  
many interesting ways.

*Chad Blindauer*

Mitchell, South Dakota

*The corn crop is expected to grow by 25 percent — about 3 billion bushels — in the next decade.*

## Where Will America's Future Corn Go?

- **More for ethanol, at least initially** — It's clear that we will use more corn than ever to fuel our cars in the next decade. Ethanol, which consumed a quarter of the national corn crop in 2008, is expected to consume about a third of the crop in the coming decade according to Department of Agriculture forecasts. Eventually, corn used for ethanol will recede as a share of the corn crop as biofuel producers create more and more economically viable technology for making fuel from other plant materials.
- **More for food** — Corn is used to make many packaged food products we use every day, especially for industrial uses like making chemicals and non-food products. This industrial corn use will grow significantly, perhaps as much as 40 percent.<sup>3</sup>
- **Plenty for livestock feed** — Corn for animal feed and reserves has long been the largest single use of corn and accounts for nearly 50 percent of national livestock consumption today. It's expected to consume just 40 percent of corn by 2019. In fact, the Department of Agriculture says the use of corn for industrial products and food-processing will surpass animal feed in the 2009 harvest season.

Demand for corn from livestock and chicken producers has actually been relatively flat for a decade as the livestock industry becomes more efficient and the feedlots replace some corn with distillers grains, a co-product of producing ethanol.

- **About the same for exports** — America has always helped feed the world. By far the largest corn producing country on the planet, in 2008 America exported about \$13 billion worth of corn, mostly to Japan, Mexico and Korea. Corn exports are projected to stay flat at 15 percent, according to the Department of Agriculture.
- **Affordable food and fuel prices** — Farmer productivity has kept the national price of corn per acre remarkably flat for decades, which has saved Americans billions in food costs — especially when compared to the increased prices of other goods and services during the period.
- **Billions of bushels left over** — Even with all the changing and new demands, there's no danger of a corn shortage any time soon. The Department of Agriculture forecasts that there will still be more than eight percent of the crop — several billion bushels — left over by the end of the year in 2018.

## Yields for 2009 Show Dramatic Production Increase

In the fall of 2009, South Dakota farmers were poised to harvest another in a series of record corn crops. The 2009 South Dakota bounty was projected at 690 million bushels, up an amazing 18 percent from the 2008 total corn harvest.

With an average price per bushel of \$3.50, the 2009 corn crop will be worth an estimated \$2.41 billion. Ag experts expect 73 million of those bushels to be fed to South Dakota livestock and another 300 million bushels being processed through the state's ethanol plants. Both uses will greatly increase the crop's economic benefit to South Dakota.







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## Livestock — The Original Value-Add

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### One of the best ways to add value to corn is still by feeding it to livestock.

Even as other demands for the American corn crop grow, nationally, feeding livestock still remains the number one use, as it has for decades. The number one use of corn in South Dakota is ethanol production, but livestock still consume a significant portion of the state's crop, about 15 percent.

In 2008, South Dakota farmers raised more than 585 million bushels of grain. About 87 million of those bushels (15 percent of the total) were fed to livestock. (Nationally about 45 percent of the corn crop is fed to livestock.)<sup>8</sup>

### Livestock Creates Incredible Return on Corn Investment

If you took the 87 million bushels of corn South Dakota fed to its livestock and sold them on the 2008 grain market instead, your return would have been about \$313 million. But by feeding the majority of those bushels to the state's 3.7 million beef and dairy cattle and 1.3 million hogs, corn helped create \$3.6 billion in livestock value. That's not even counting the value added to corn by feeding it to the millions of chickens and turkeys in South Dakota.<sup>8</sup>

You don't have to be a math whiz to realize that investing \$313 million worth of South Dakota corn into South Dakota cattle and hogs to help create \$3.6 billion in value is a pretty good investment. If only all American industries could post that kind of return on investment (ROI).<sup>8</sup>







One of the best ways to add value to our corn crop is by feeding it to our livestock. The value grows right along with the livestock.

Any state where you find a successful livestock industry you'll also find a successful corn industry. The two just go hand in hand.

Even with all the other excellent uses of corn being developed, using it to produce livestock is always going to be a great way to add value to the crop.

I get a lot of personal satisfaction walking through the butcher department at our local grocery store knowing my family helps produce the best-tasting, highest quality meat in the world.

*David Fremark*

St. Lawrence, South Dakota

## South Dakota Corn Economics

87 Million Bushels of Corn Sold = **\$313 Million**



87 Million Bushels of Corn Fed = **\$3.6 Billion**



3,700,000



2,837,000



4,700,000



1,330,000

Source: U.S. Dept. of Agriculture

*In 2008, feeding \$313 million worth of corn to South Dakota livestock helped generate \$3.6 billion in value.*

## South Dakota Agriculture Crop Overview

	All Purpose Acres Planted	Harvested Acres	Yield (Bushels)	Value of Production Dollars
<b>Corn for Grain</b>	4,750,000	4,400,000	133.0	\$2,106,720,000
<b>Soybeans</b>	4,100,000	4,060,000	34.0	\$1,249,262,000
<b>Hay (All Types, Dry)</b>	N/A	3,850,000	2.0 tons	\$762,000,000
<b>Oats</b>	220,000	120,000	73.0	\$21,900,000

Source: U.S. Dept. of Agriculture





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## Corn Will Affect Your Life Today

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From the most remote rural counties to the most intensely urban cities, the effects of corn are everywhere.

If you think corn isn't important in South Dakota and the nation as a whole, then you don't know much about corn — or economics.

### You're a Big Corn Eater, Guaranteed

While Americans may go their entire lives and only see the kind of corn that comes in a can, they most certainly will consume tons of it — almost all of it indirectly. Anyone who eats meat, eats corn. High-fructose corn syrup sweetens hundreds of products. Even our dogs eat bushels of corn in their bagged, commercial food.

What's more, Americans increasingly use corn-based ethanol to power their cars, replacing a finite, foreign fossil fuel with a renewable, grown-in-America source of power. And, even now, scientists are finding new, more economically viable ways to use corn as the raw material to create a growing array of products.

### The Foundation of America's Food Chain

Supporting this entire food and fuel chain are farmers in South Dakota and across America. Their incredible ability to harvest corn — more than 12 billion bushels of corn per year nationally, and increasing — is only topped by the stratospheric climb in productivity, from an average of 55 bushels per acre in 1988 to 133 bushels in 2008 in South Dakota alone.



*If you think corn isn't important in South Dakota and the nation as a whole, then you don't know much about corn — or economics.*

## Affordable Food and Fuel

American farmers' incredible productivity has driven the cost of food and fuel to the point where we spend less of our disposable income on food than ever — far less than the people of any other nation — while saving billions in the cost of gasoline.

Affordable food, affordable fuel and a renewable raw material for a growing array of bio-friendly products — that's the legacy, and future, of South Dakota corn farmers.

For more information on the role corn plays in our state and nation, visit the South Dakota Corn Web site at [www.sdcorn.org](http://www.sdcorn.org).



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- 3 Fertilizer utilization statistics — research conducted by Blue, Johnson & Associates provided by the Corn Farmers Coalition
- 4 Corn yield and crop value data for South Dakota and the United States — the United States Department of Agriculture (USDA), the National Agriculture Statistics Service (NASS) and the South Dakota Agriculture Statistics Service
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- 6 Food CPI and Expenditures — the United States Department of Agriculture (USDA), Economic Research Service
- 7 Corn use in South Dakota data — PRX The ProExporter Network® report, July 2009
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## Additional Sources

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Soil erosion data — the United States Department of Agriculture  
South Dakota ethanol data and economic impact conclusions — the South Dakota Corn Utilization Council  
Future corn use estimations — Corn Farmers Coalition





For more information on the power of corn, visit [www.sdcorn.org](http://www.sdcorn.org).

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