

## **Challenges and Opportunities in Agriculture Today**

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### **Introduction**

It's a special pleasure for me to be here at the AFA's Alliance Forum and to be able to speak to a group of young agricultural professionals.

I greatly admire the work the AFA Alliance does to support and encourage young people pursuing careers in agriculture. Agriculture is vitally important to the health and welfare of all Americans. The food and agriculture sector undergirds our entire economy and society. Indeed, agriculture is important for the well-being of our nation.

Now more than ever, we need young, bright, energetic leaders in the food and agriculture business to ensure its success and thereby the success and future of the Nation.

Today is a very exciting time to be involved in agriculture—in fact I've never seen such challenges or such opportunities in the 40+ years I've spent in agricultural research, education, and extension, and Administration.

As you may know from my biography, before going to Washington, D.C., I spent all of my professional career at Land Grant Universities, teaching and later serving as a Dean and Director of the Alabama Agricultural Experiment Station before going on to the University of Georgia where I was Dean and Director of the College of Agricultural and Environmental Sciences.

My relationship to agriculture, however, actually began growing up on a farm in north Florida. As a farm kid I was involved in 4-H and have many fond memories of my experiences as a 4-H'er. In fact the first purebred animals ever brought to our farm were 4-H projects—a New Hampshire gilt and a Guernsey heifer calf.

In my FFA experience, I learned leadership skills in getting my brothers to do their chores. Being the oldest, either I got my brothers to help or else I did all of them.

I suspect many of you may come from farm and rural backgrounds as well. I hope you too share a love for agriculture like as I have.

Thomas Jefferson called agriculture one of the pillars of our society. He said: *"Agriculture... is the first in utility, and ought to be the first in respect."*

## **Changes in Agriculture**

Of course in Jefferson's time, most people were farmers. Today, America is no longer an agrarian society. Our population is more urban and suburban and we have become a diverse multi-cultural society. And over the past 20-25 years, the way we farm, process, cook, and even how we prepare and eat food, have all changed.

Look at the growth in organic foods; probiotics; high-value processed foods like bagged salads

Science and technology have led to advances in processing, marketing, and transportation technologies that have opened new markets to producers, increasing both demand and competition for American agricultural products.

Trade is vitally important to our farmers today; so much so that agriculture is now twice as reliant on export markets as other economic sectors.

American producers have adapted to the new environment by greatly increasing coordination between producers, processors, and retailers, and through the consolidation and concentration of farming operations.

This has led to changes in the size, numbers, locations, and distribution of farms. Today, there are fewer farms but farm size has increased and American agriculture has become increasingly diverse.

Today, our farmers and producers operate in a highly competitive global marketplace driven worldwide by consumer demands.

Consumers too have changed. Demographically, America is more diverse, consequently there is more demand for a wide variety of ethnically diverse food.

The American population is getting older. This older population has different demands. Older Americans tend to eat more fruits and vegetables. Some consumers who desire more convenience, such as pre-cut meat, bagged vegetables and salads, and oven-ready entrees. Almost all consumers demand more nutrition and higher quality food products. Consumers today are not only concerned with the price and qualities of food, but also the safety, and increasingly, the environmental impact of growing that food.

Additionally, there is a growing middle class in emerging economies like China and India who are creating new markets for high value foods such as meat, dairy products, and vegetables.

Our food and fiber industry faces more competition in the global marketplace. This competition means that we need to find new markets, develop new products for specialty markets, and find new uses for agricultural products, such as biofuels and other biobased products.

Farming no longer anchors most rural communities and economies as it did throughout the mid-20th century. Seven out of eight rural communities are dominated by varying mixes of services, manufacturing, and other non-farming activities.

Other changes have affected rural America and American agriculture. The number of farms continues to shrink while the size increases. We've gone from about six million farms at the beginning of the 1900s to less than two million today.

With increasing mechanization the percentage of the U.S. labor force working on farms dropped from 39 percent in 1900 to less than 2 percent today.

Globalization, consumer demographics, science and technology, energy—all these things are driving the future of agriculture in the United States.

For example, today, consumer demands are driving an increase in specialty crop production and organic farming. Specialty crops now account for \$50 billion or 42 percent of the value of crop production in the United States.

### **The Grand Challenges**

But perhaps the biggest drivers of agriculture today are what I refer to as the “Grand Challenges of the 21<sup>st</sup> Century.” These are sustainable energy security; global climate change; water quality security; and food security.

In fact energy security and climate change have literally changed the paradigm for agriculture. Today agriculture is a provider of food, feed, fiber, and I like to say flowers—as well as fuel.

All four of the Grand Challenges are interrelated. And because our current reliance on petroleum products contributes to greenhouse gas emissions, energy security and climate change are closely linked.

Because water is so essential to life and agriculture and climate change could impact both, ensuring we have enough water of an acceptable quality is critical.

In recent years, the world's appetite for energy has driven up the price of petroleum to record levels. And future world energy consumption is projected to increase 50 percent by 2030. The greatest growth is expected to come from the developing economies of China, India, and other Asian nations.

The recent decrease in petroleum prices is the result of the downturn in the economies around the world. You can bet, at some point, the prices will go back up! Today, almost two-thirds of recent global growth in oil demand has come from China, India, and other rapidly growing economies. Despite the fact that gas prices have come down recently, energy security is an issue that is not going to go away until we break our petroleum habit.

Our cost for importing foreign oil is now almost between 1 and 2 billion dollars per day and likely to increase in the future. That makes our yearly cost for importing oil between 400 and 700 Billion dollars per year.

Our nation has made a commitment to reduce our dependence on imported petroleum. Renewable energy from biofuels production is one part of the solution...along with other renewable sources like wind, solar, hydro, ocean and river currents, and geo-thermal energy. Of course, a big part of the solution is conservation.

A year ago, President Bush called for a 20 percent reduction in U.S. gasoline use by 2017 and Congress passed the Energy Independence and Security Act of 2007 which calls for production of 36 billion gallons of biofuels by 2022. This is a 5-fold increase above current levels. The new energy act also caps our production of corn-based ethanol at 15 billion gallons a year which clearly requires the commercialization of the next generation biofuels...cellulosic ethanol.

Fortunately, the United States has abundant agricultural and forest resources that can be converted into biofuels. Recent studies by USDA and the U.S. Department of Energy (DOE) suggest these resources can be used to produce enough ethanol – 60 billion gallons/year – to displace about 30% of our current gasoline consumption by 2030.

The United States is now the world's leading producer of biofuels. We're first in ethanol, second in biodiesel, and growing in both areas.

We now have about 162 ethanol biorefineries in the U.S. and more under construction. We also have more than 170 biodiesel plants in operation with another 57 in the works.

Ethanol production in the United States has grown from 175 million gallons in 1980 to 1.4 billion gallons in 1998, to about 9 billion gallons in 2007. We will be bumping up to 12 to 13 billion gallons per year in a year or two.

Last year, we produced 450 million gallons of biodiesel. That's up 80 percent from 2006. Today there are more than 650 biodiesel fueling stations in America.

None of this would have been possible without the hard work of America's farmers and the agriculture industry.

The U.S. is the also the world leader in bringing cellulosic ethanol into production. The Department of Energy (DOE) has invested in three new Bioenergy Research Centers and is working with private industry to develop six commercial-scale cellulosic ethanol refineries and seven smaller-scale ones.

The first demonstration-scale cellulosic ethanol plant in the United States opened in June. Located in Louisiana, the plant will use sugarcane bagasse, dedicated energy crops, wood products and switchgrass to produce ethanol.

Other cellulosic ethanol plants are being built across the country—one in Georgia will use forestry residues—one in Tennessee will use switchgrass—another in California will use variety of biomass materials—wood waste, agricultural residues and municipal solid waste.

DOE has also recently announced an agreement with POET, LLC, a large ethanol production company, to construct and operate a commercial scale biorefinery that will be collocated at their Emmetsburg, Iowa, ethanol plant. This biorefinery will use corn cobs and eventually corn fiber or corn stover to increase plant production of ethanol by 25 million gallons per year.

USDA has also invested heavily in renewable energy. The new Farm Bill includes more than \$600 million in new mandatory funding for renewable energy programs over the next five years. And that's on top of the \$35 million that we're spending today for woody biomass research and renewable energies.

That new \$600 funding creates a new biomass crop assistance program to help producers who want to grow biomass crops and also to develop conversion facilities.

The Energy Title provides \$320 million in mandatory funding for loan guarantees for commercial and pre-commercial biorefineries to produce these advanced biofuels.

The new Farm Bill also reauthorizes the USDA Biodiesel Education Program for an additional five years. The program educates producers and consumers about the benefits of biodiesel.

Education efforts will focus on the importance of maintaining fuel quality throughout the production and distribution system and also developing new feedstocks for biodiesel, such as animal fats and recycled restaurant grease.

So far in our quest for greater energy dependence, America's farmers have risen to the challenge—producing a record corn crop in 2007 of 13.1 billion bushels. Last year ethanol use, projected at 3.0 billion bushels, surpassed exports for the first time ever, accounting for 23 percent of total corn use.

Corn prices are expected to rise again in 2008/09. Demand is expected to remain strong, supported by expanding use for ethanol, which is forecast to reach 4 billion bushels in 2008/09.

And despite this year's floods, U.S. farmers expect to harvest nearly 79 million acres of corn and more than 72 million acres of soybeans in 2008. From April 2007 through April 2008, corn and soybean prices rose by over 50 percent. Of course, they are down quite a bit now.

Demand remains high for high-quality U.S. agricultural products. This year USDA expects agriculture exports to reach a record level of \$109 billion. That's up \$26 billion over 2007's record-breaking performance, and it represents a phenomenal jump of \$40 billion in export sales over the past two years.

We expect net farm income to reach \$96 billion this year as well, and that's driven by the strong prices for agriculture commodity crops. This would be 57 percent above the 10-year average of \$61.1 billion.

The outlook for American agriculture is very good; having said that, our nation's farmers and producers are also coping with higher costs of fuel and feed and fertilizer.

The roughly 60 percent increase in the world price for oil over the last 12 months that we've seen has had a strong impact on farm operations and retail food prices. Of course, oil is down considerably from what it was this past summer.

And the increases that we've seen recently in the food prices have caused some to blame ethanol and biodiesel for those rising food prices. They argue that if we just stopped making ethanol from corn and biodiesel from soybeans we'd be just fine on that food price increase front.

But the facts just don't bear that out. Taking biofuels out of the energy portfolio would do nothing to blunt the impact of higher oil prices on our agriculture or any other sector of our economy.

In fact it really would mean higher energy prices for everyone. The Department of Energy calculates that blending ethanol into gasoline reduces the price of a gallon of gas by 20 to 35 cents a gallon.

For the nation as a whole, those savings amount to between \$30 billion and \$50 billion a year.

Globally, there are many supply and demand factors at play affecting commodity prices. For one thing, higher incomes, population growth, and depreciation of the dollar are increasing the demand for food worldwide.

Strong global economic growth, particularly in developing countries is creating a growing middle class in some foreign countries. This means increased consumption of meat, dairy products, and vegetable oils.

Additionally, drought and dry weather have lowered production and reduced stocks in many grain producing regions of the world; and some countries have imposed export restrictions.

All these factors contribute to higher commodity prices. In addition, record prices for gasoline and diesel fuel are increasing the costs of producing, transporting, and processing food products.

Of course the best way we can minimize the impact of biofuels production on food prices is to move towards more sustainable next-generation biofuel technologies that do not rely on grains and oilseeds used for food or feed.

That is why the Administration has refocused its policies on ethanol and heavily investing in new technologies that will produce cellulosic ethanol from a wide variety of biomass sources.

These biomass sources include new energy crops like switchgrass, miscanthus, hybrid poplars, and other crops as well as agricultural and forestry residues and waste products such as restaurant grease.

Of course there are other important environmental benefits from replacing petroleum with renewable fuels. DOE scientists found that corn ethanol from the U.S. reduced greenhouse gas

emission 19 percent compared with gasoline. This occurred when the full "life cycle" of the fuel is considered – from growing it to producing the fuel and burning it.

DOE scientists estimate that 13 million tons of greenhouse gases were avoided in 2007 due to biofuels production and use.

Additionally, ethanol is also being used to replace methyl tertiary butyl ether (MTBE), a toxic additive, in gasoline.

The next generation of biofuels—cellulosic—made from switchgrass, corn stover, wood chips and other non-food sources promises even more significant reductions in greenhouse gas emissions than corn-based ethanol – reductions of more than 86 percent compared with gasoline.

Moving away from petroleum to a bioeconomy has many positive attributes. Using biomass for energy strengthens rural economies, decreases America's dependence on imported oil, avoids use of highly toxic fuel additives, reduces air and water pollution, and reduces greenhouse gas emissions.

There's just no going back. The U.S. has made a commitment to reducing its dependence on foreign petroleum.

This goal presents agriculture and rural America with a tremendous opportunity to lead the way toward reducing our reliance on foreign energy sources. As I said earlier, in my 40 plus years as an agricultural scientist and administrator, I've never experienced such exciting times.

There are a number of distinct eras in agriculture. Let's review the most recent. Mechanization in the 20-30s and 40s; this was followed by the development of hybrid corn in the 30s and 40s. As a student and young professor, I came along during the heyday of agricultural chemicals in the 50s and 60s; then the era of biotechnology in the 70s and 80s. But, today, the era of bioenergy and bioproducts is clearly agriculture's "New Paradigm" for the 21st Century. Indeed, this is the new era of the bioeconomy.

It will take strong leadership in Washington and in the agriculture industry throughout the country to ensure we continue on the path we have begun—the path towards a more secure future for all Americans.

The role you play is critical. You will be a part of one of the greatest transitions in history as we move from a fossil-based economy to the bioenergy of the future.

Thank you and God Bless America.