

**Challenges and Opportunities for Sustainable
Agriculture**

**Presented at the
New American Farm Conference**

20th Anniversary of SARE

Kansas City, Missouri

March 25, 2008

It's a special pleasure to participate in celebrating the 20th Anniversary of the Sustainable Agricultural Research and Education (SARE) program. Thank you for the opportunity to express my appreciation to you and share some of the major challenges agriculture and our Nation face today.

You may know from my biography that I have spent my entire professional life at Land Grant Universities, until my current appointment. I was a student at the University of Florida and Iowa State. I have held appointments at Auburn and the University of Georgia. But I really need to start with growing up on a small farm in North Florida.

My father was an avid conservationist. He was constantly improving the terraces and grassed waterways, planting cover crops and even hauling weeds and other debris to the poor spots in the fields of our farm. Of course, at the time I thought it was just his plan to keep my brothers and me from hunting or going to the local swimming hole.

As a result of these experiences, I learned first-hand the importance of caring for and improving the land while maintaining productivity and profitability. Over the years, I watched our farm change from an eroded hilly farm to a much more productive farm that anyone would be proud to own.

Of course, that was more than 50 years ago; and now I truly understand the wisdom of my father.

Today, it hardly seems possible that 20 years have passed since SARE began.

In those early days, when there was a lot of skepticism whether agriculture could be both profitable and sustainable, who would have thought it possible that integrated, sustainable agriculture would become, not only, fashionable but truly “mainstream”?

In fact, SARE came along at the right time to be at the leading edge of a revolution that has been happening in throughout Agriculture.

Over the past two decades agriculture has been changing from a commodity and production-driven system to a global consumer-driven system.

And today those consumers care about the safety, nutrition, and quality of their food more than ever. They also care about how and where their food is grown and produced. The really thinking people are also concerned about not only maintaining, but improving our land and water resources in order to assure food and other necessities for the future.

The rising popularity of organic foods, the growth in Community Supported Agriculture, and the increase in the numbers of organic farms all point to the growing concerns consumers have about agriculture's impact on the environment.

Before I go into my comments, I'd like to offer a few commercials. First, a comment on the Farm Bill.

The Administration's proposals for the new Farm Bill recognize the changing needs of both farmers and consumers. That's why the Administration's proposals call for increased spending on vital programs such as nutrition, conservation, specialty crops, fruits and vegetables (including organics), and renewable energy and research and education.

As many of you know, before leaving for Congressional recess, the House and Senate passed, and the President signed a 33-day extension of current farm law. The

extension will help avoid serious disruptions if current law expires.

The President has indicated that he would like to sign a good farm bill this year! The Administration believes that the government has a responsibility to provide America's farmers and ranchers with a timely and predictable Farm Bill.

The consequence of not coming up with a bill that provides new legislative reforms means that important topics such as energy, increased costs of nutrition, trade balance, specialty crops, biofuels and bioproducts, research and education will not be addressed.

Maybe some of you attended one of the many Farm Bill Forums that former Secretary Mike Johanns held throughout the country over 2 years ago. I was able to attend one of the forums in Georgia and recognized that farmers, ranchers & stakeholders really want reform. It is imperative Congress recognizes that our proposals are

based on the comments of over 4,000 farmers, ranchers, and other stakeholders who want reform.

It is my hope, and still expectation, that the House and Senate can settle their differences and provide the President with a good farm bill that meets the future needs of America's farmers and all people of this country that are affected by this legislation.

Regardless of what happens with the Farm Bill, the Nation's farmers will still need to find new ways to reduce inputs, improve efficiency, and lower the environmental footprint of their farming operations.

My second commercial is with regard to the Ag Census. If you received a census form, I urge you to complete it and return it as soon as possible. Information gleaned then through the census provides the basis of many of the farm programs.

My third and final commercial is with regard to the free trade agreement.

As you are all aware, in today's global economy, trade is vitally important; even more so for agriculture. Compared to the general economy, U.S. agriculture is twice as reliant on overseas markets. Last year the U.S. exported \$81.9 billion worth of agricultural products. Next year we're forecasting exports to reach \$101 billion. And every dollar of exports creates another \$1.48 in supporting activities to process, package, finance and ship agricultural products.

So anytime we increase access to new markets is good news for American agriculture.

Currently, the Bush Administration has transmitted the Columbia Free Trade Act to Congress. The agreement will eliminate tariffs and other barriers to goods and services, promote economic growth, and expand trade between the two countries.

Colombia is already an important market for America's farmers and ranchers. In 2007, the United States exported a record \$1.2 billion of agricultural products to Colombia.

The American Farm Bureau Federation predicts that this agreement, once fully implemented, could provide \$690 million in gains each year for American agriculture. In addition, the free trade agreement with Colombia is supported by over 40 U.S. agricultural and food associations.

So that's good news for agriculture. If any of you attended the Ag Outlook Forum in February you may have heard USDA's Chief Economist, Joseph Glauber, say that, "The outlook for agriculture has rarely, if ever, been more favorable."

Now more than ever as we gear-up for another record year, we need to continue to promote sustainability. Improving the sustainability of agricultural systems will be

increasingly more important in future years and you have provided an important source of innovative solutions.

Since 1988, the Sustainable Agricultural Research and Education program has helped advance farming systems that are profitable, environmentally sound, and good for communities.

SARE has truly been at the leading edge of integrated agricultural systems farming.

Today, thanks in part to the successes of SARE we now have policies in place that make sustainability a focus of all USDA programs.

Even more importantly, we also have more and more farmers adopting conservation practices like no-till, using cover crops and precision agriculture techniques and prescribed grazing management.

For example, conservation tillage of U.S. planted crop acreage rose from 26 percent in 1990 to 41 percent in 2004.

I would like to point out that after completing my graduate studies in 1964; I began my research career at Auburn University. One aspect of my research was in no till. While my research focused on no till soybean, I also worked with reduced tillage systems in cotton, peanuts, and some other crops. My equipment – an early Alice Chalmers no-till planter.

Conservation practices such as no-till can save farmers over 200 million gallons of fuel per year, while other conservation practices, such as irrigation water management, can reduce diesel consumption by 80 million gallons per year.

In addition to energy savings, these practices provide obvious co-benefits to the environment.

By adopting more sustainable farming techniques, farmers are saving tons of soil and energy, and millions of dollars in labor and fuel costs.

To illustrate the affect of adopting energy saving practices such as conservation tillage, it is interesting to note that the combined use of gasoline and diesel fuel in agriculture has fallen from a historical high of 7.7 billion gallons in 1973 to 4.6 billion gallons in 2002. This represents a 40 percent drop in fuel use.

Additionally, the number of gallons of fuel used to produce a ton of grain dropped from 33 gallons in 1973 to 13 gallons in 2002—a 59 percent decrease.

Let me emphasize much of this success is directly attributed to the success of your research, education, and extension efforts.

A major reason behind this increase in efficiency is the shift to minimum tillage, no-tillage, or reduced tillage on two-fifths of U.S. croplands.

Crop rotations and other cultural practices significantly reduce fertilizer use. While fertilizer and irrigation accounts for a substantial portion of the energy consumed by agriculture; transportation, packaging, marketing, and kitchen preparation account for much of the remaining energy used by our food and agricultural systems. These are all areas that lend themselves to efficiency improvements.

We've come a long way in 20 years but there is much more work to be done.

Sustainable agricultural practices are becoming more widespread in part because SARE has helped prove they work.

For 20 years SARE programs have brought researchers, educators, and farmers together in a unique partnership centered on the direct input and participation of our farmers and ranchers — the people who need and use the knowledge generated from USDA and Land Grant University research. I also wish to acknowledge the important contributions of other universities as well as American industry.

SARE's "hands-on" approach has been very successful. It's being adopted by other programs.

Today the things SARE helps promote: the profitability, sustainability, and quality of life for farmers and rural communities are even more important.

The Future

We must continue to "Advance the Frontier of Sustainable Agriculture" and consider the economic, social, and

environmental impacts of agriculture through research and education programs like SARE.

Today sustainable agriculture is more than an idea whose time has come.

It is an imperative for our future. Now let me tell you why.

At the present, I believe we are seeing the unfolding of a new paradigm for agriculture.

Agriculture is changing from a producer of food, feed, fiber, and flowers, to a producer of food, feed, fiber, flowers, and FUEL!

The new paradigm, as I see it, involves a number of challenges that we must meet. This starts with a few that I consider agriculture's "Grand Challenges." The first is achieving sustainable energy security. Note the emphasis on sustainable.

Energy is a vital national security issue. It is also vital to our economic security.

There are numerous indicators pointing to the need for sustainable energy security. Presently the U.S. consumes 25 percent of the world's total oil production, yet we only own 2 percent of the proven oil reserve. We use about 21 million barrels of oil per day.

Oil is also getting harder to find. Established oil and gas fields are maturing or they are in difficult to access areas, such as the Arctic or in deep-ocean waters or they are in unstable regions of the world.

Tight supplies are making prices higher and more volatile. Some experts are saying we will soon reach "peak" oil if we haven't already. This is certainly a sobering thought.

The bottom line, for every two barrels of oil we use, we only are finding one new barrel.

You might ask, “Won’t wind, hydro, geothermal, nuclear, hydrogen, and as yet unnamed sources solve our energy problems in the future?”

Let me start with a few assumptions:

- 1) Energy is as necessary for the survival of our civilization as food and water.
- 2) Today, much of our energy is derived from finite sources.
- 3) If we are concerned about the future of life as we know it on this planet, we must move to a sustainable energy future. Think of the close analogy. We have, thanks to your efforts, a sustainable food future. Just think, “what if my food was a finite resource?”
- 4) There are a number of opportunities to achieve energy sustainability; e.g. wind, photovoltaic cells, hydro, geothermal, ocean waves. Already agricultural lands are being used for “wind farms”.

Of course, the sun is the ultimate energy source- and it will burn out in 4-6 billion years.

There are two principal ways of capturing the sun's energy:

- 1) Photovoltaic cells or solar panels; and
- 2) Green plant photosynthesis.

Capturing the sun's energy through green plant photosynthesis is clearly one of the important approaches.

In the U.S., biomass is our largest renewable energy source. Right now, it is also the only practical renewable alternative for liquid transportation fuel.

As gasoline prices continue to climb, demand for renewable fuels such as ethanol and biodiesel are rising. We now have over 130 ethanol refineries in operation and 77 more plants are under construction or expanding to meet demand.

There are also 105 commercial biodiesel refineries in the U.S., many of these are expanding and more are under construction.

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.

Likewise, our biodiesel production capacity could soon reach 700 million gallons per year (roughly 10 times 2005 production levels).

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.

Biomass can be used to produce ethanol and biodiesel as well as for generating electricity.

In the future, biorefineries will use advanced technology such as hydrolysis of cellulosic biomass and/or thermochemical conversion of biomass to synthesis gas for fermentation or catalysis to produce biopolymers and fuels – in other words, to produce gasoline.

Our USDA and university scientists are working with other scientists around the world to develop new non-food energy crops like switchgrass, miscanthus, and hybrid poplars along with better conversion technologies.

USDA is committed to ensuring sustainable biomass production. That's why it's important we use all the tools we have to develop new crops that will require fewer inputs, such as water and fertilizers, and that will convert more easily into biofuels.

Another grand challenge for agriculture—water. Fresh, clean water is necessary for life as we know it. Some would say, “Water is the single most important nutrient.” Clearly, fresh, potable water is necessary for life. There is

no replacement for its essential role in maintaining human health, agriculture, industry, and our sustainable ecosystems.

Today, depleted ground water reserves, degraded water quality, and adverse climactic conditions are reducing the quality and the quantity of freshwater.

Agriculture is the single greatest water consumer in the world. In view of that fact, we have a responsibility to use and manage water resources in a responsible and sustainable manner.

Globally, farmers are irrigating five times more land than at the beginning of the 20th Century.

In the U.S., irrigated agriculture represents 62 million acres or 18 percent of total cropland, providing 60 percent of farm-gate value. Freshwater demand from all sectors is expected to double by 2035.

Water demand conflicts often pit traditional uses, such as agriculture and navigation, against more contemporary demands by recreation, industry, urbanization, and ecosystem support.

Energy and water are closely allied. As agriculture moves to the production and processing of agriculture and forestry feedstocks into biofuels and bioproducts, there will be a greater demand on water.

Besides protecting and conserving our freshwater resources, agriculture and agricultural research, education, and extension plays a vital role in protecting our oceans and fisheries.

Sustainable agricultural systems can reduce the use of fertilizers, pesticides, and nutrients from manure from entering the water supply.

A third component of the grand challenges is Global Climate Change. In a recent speech at the Washington

International Renewable Energy Conference (WIREC), President Bush said:

“Energy Security and Climate Change are two of the greatest challenges of our time.” He went on to say, *“the world’s response will shape the future of the global economy and the condition of our environment for future generations.”*

Energy security, water, and global climate change are just three of the grand challenges for agriculture that I see on the horizon. Obviously, there are many other challenges.

What is also obvious is that sustainability will remain a vital component if we are to ensure we can continue to meet the world’s growing needs for food and energy.

It has been interesting to observe the rapid emergence of the term “sustainability” with regard to energy. As others think they have invented a new concept, I reflect on our long involvement and recognition of the importance of

sustainability as it pertains to agriculture. It pertains to food and energy, as well as all other areas of agriculture.

We are poised on the brink of some of the greatest challenges in history. Achieving sustainable energy and water security, along with developing a better understanding Global Climate Change while maintaining food, feed, fiber, and flower needs for the people of this country, represent challenges of enormous proportions. They are certainly a far greater challenge than sending a man to the moon and bringing him safely back to earth.

Agricultural research, education, and extension programs which will help make integrated agricultural systems truly sustainable are vital to our success, and, indeed, the success of our civilization.

No less than our future depends upon it.

Thank you.