Technology, Food and Our Future

Feeding a world that's growing will take technology and increased communication with consumers.

Story & photo by ***Mathew Elliott***

People have to eat. It's a simple fact of life. The growing world needs to be fed, but who is going to feed its growing population? At Kansas State University's (K-State's) Cattlemen's Day, agricultural economics professor Ted Schroeder spoke on how the future of the United States' ability to feed the world could depend on how we adapt to research and emerging technologies.

"We start by looking 40 or 50 years out at this challenge (of feeding the world)," Schroeder said. "Why start this dialogue? What do the world patterns, demographics and population dynamics imply for us in agriculture? We have a very big important role in feeding the world; food is essential in an expanding population."

Schroeder cited U.S. Census Bureau data predicting a 35% increase in the world's population during the next 40 years, a statistic which will imply more than 2 billion additional people that will need to be fed by 2050.

To understand the future, Schroeder took a step back.

"The allocation of resources has had enormous impacts on our world, security and our overall interactions," Schroeder said. "There was a famous economist Malthus (Thomas Malthus) who said that resources are limited and scarce; and, oh by the way, sometime you will exhaust those resources. You will use them all up. What happens when exponential population growth and scarce resources meet? The allocation of those resources will be decided through misery and vice. We will kill each other for those resources; that's how important they will be."

►K-State agricultural economist Ted Schroeder speaks on what it will take for the U.S. to feed the world in the future.

What Malthus didn't account for was the rate of advancement in technology to increase production, Schroeder said. He did not think that advancements would be able to keep up with the population expansion rate.

"My main message today is that we need technology," Schroeder said, "or we will have misery and vice. Technology is absolutely critical to getting the world fed in 2050."

Iowa vs. Italy

Schroeder used the example of U.S. corn yields. Using a graph, he showed steady yields from the early 1900s until about the 1970s and 1980s. During this approximate 10-year span, yields exploded. The reason for this rapid growth was the development of genetically engineered corn — exemplifying technology in action.

A look at Iowa vs. Italy shows what can happen with the adaptation of technology. Italy is one of the European Union's (EU's) top-growing corn countries. Italy used to typically outyield Iowa, but those numbers have changed, and now Iowa outyields Italy by approximately 50 bushels (bu.) per acre. Why? Iowa enhanced yields with genetically engineered varieties, while Italy, and Europe in general, resisted adoption of these varieties.

Think about what corn and feed prices would have been this year if the U.S. had not adopted technology, Schroeder noted. Think about having yields approximately 30-50 fewer bu. per acre across the U.S. It would make 2008 corn prices look pretty good.

Price shifts?

World food prices have been steadily increasing and almost doubled from 2003 to 2008. Schroeder said the U.S. population currently spends approximately 10% of its income on food. Consumers saw the increase at the grocery store, paying almost double on some items.

What would happen if the 10% of income Americans spent on food increased to 60% — as it is in many underdeveloped countries? Staples of our diets could quickly turn into luxuries. Such an increase would lead to misery and vice, Schroeder said.

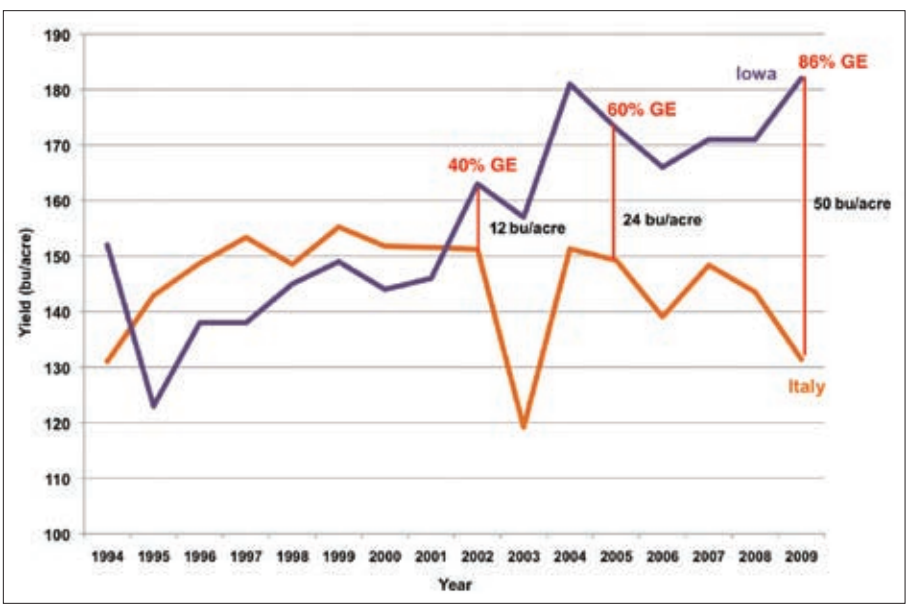
Food riots and protests have erupted in poor countries due to food prices. The most recent example would be in Haiti when residents had to line up for basic necessities after the earthquake.

So what will it take to avoid the misery and vice?

"Increased technology and research are the only ways to get food prices down using the current resources we have," Schroeder said.

Fortunately for the beef industry, while

Fig. 1: Comparison of corn yield in Iowa vs. Italy, 1994-2009



Source: T. Schroeder, Kansas State University based on data from USDA-FOASTAT and Eurostat.

food prices are rising, there is also an increase in global income growth. With increased income, producers will see an increased demand for their product.

As income goes up, diets typically move from grain-based to more of a meat and protein-based diet. This might start with chicken and pork, as they are cheaper than beef to produce, but more income will eventually mean more demand for beef, Schroeder said.

With so many opportunities out there, who is going to supply the world with the increased food demand? The answer, he said, is whoever is best able to meet the consumer's demands and adopt the technology that they want.

"The U.S. industry is challenged," Schroeder said. "Brazil is increasing beef production rapidly. Our competition out there is well-educated, young, eager, energetic and confident. They also know what it takes to adapt to technology; Brazil has had phenomenal beef production technology adoption."

To continue feeding the expanding population, Schroeder said, U.S. beef producers must discover, develop and adapt, because if they do not, others will.

"We have a huge need to educate consumers about the technology we have," Schroeder said. "As an agricultural industry in general we have failed! We developed this wonderful technology, and we didn't realize that some people do not understand what we are doing. We need to use the technology we have; it cannot stop. We need to help our consumers understand it's not just getting more pounds of beef per pound of feed or more bushels per acre, before we end up like Italy."

Technology and animal well-being

Lily Edwards, assistant professor at K-State, also spoke at Cattlemen's Day, and asked participants to take a step back and look at things from the consumer's view in her presentation, "Animal Well-Being: Bridging the Gap Between Producers and Consumers."

Edwards grew up on the East Coast with a non-agricultural background. She calls herself a very lucky consumer who was able to go to school and come to appreciate the industry and to become its advocate.

The first step in the changing consumer mindset began with laboratory animals. Some people did not like the way animals were treated, and there was an outcry. Other instances in the beef, pork and poultry industries were noticed and declared inhumane.

"We can all agree that certain things are inhumane," Edwards said. "We don't want to kick animals, beat them or any other unnecessary cruelty."

From humane practices, consumers then began to focus on the animal's well-being or quality of life.

Edwards says that, as an industry, we think we get a lot of unfair focus.

"As producers, we take things personally when someone criticizes our livelihood," Edwards said. "From de-beaking to avoid pecking to gestation crates to prevent cannibalism in swine, we have reasons for everything we do, but the average person at the supermarket doesn't think that way. Maybe we haven't done a good enough job of telling them why."

Rather than unfair focus, maybe our consumers are helping us out and bringing some things into clarity.

"I know how much we all like the HSUS (Humane Society of the U.S.)," Edwards joked, "but I must say they are very good at capturing what the consumer thinks."

After showing an HSUS commercial for Proposition 2 in California with images of dark, cooped-up animals vs. bright, "happy," free-range animals, Edwards said, "They may not always be fair comparisons, but it's what the consumer is seeing."

She advises producers to stay away from the argument that they want their animals in a good state because, otherwise, they wouldn't be making them money. First, that is putting the money aspect back in and, second, animals can be in bad health and still perform. (For a "Top 10" list of talking points not to use in an animal welfare discussion, see "10 ways to lose an argument on animal welfare.")

Edwards used an analogy by Colorado State University professor Bernie Rollin (see story in the May *Angus Journal,* page 58) about the two different ways to make an argument. It would be like the difference between sumo wrestling and judo wrestling. You can imagine that moving a sumo wrestler would be kind of hard. So if you are sumo fighting, you are doing a direct clash — two immovable sources hitting head-to-head, not gaining much ground. Judo is a little different. You use the opponent's force against him. This would be like constructively teaching the other side that they are misinformed on some issues.

"Bridging the gap, we are all customers, and bottom line is, 'the customer is always right,'" Edwards said. "They are the ones buying our product; we want them to be satisfied. This might mean we have to meet in the middle, or even a little on the public's side of the middle. We want to provide them with the safest, healthiest product possible."

10 ways to lose an argument on animal welfare

Lily Edwards, assistant professor at Kansas State University (K-State), gave attendees at K-State's Cattlemen's Day a "Top 10" list of how producers could lose the argument on animal welfare. The list was devised by D.A. Daley, California State University–Chico.

1. Assuming science will give us all the answers. Science gives us only some of the answers. Science doesn't solve ethical questions.

2. Using economics as the justification for all of our practices. We need to convince the public that we truly care about animals, not just about dollars.

3. Assuming you have to defend all agricultural practices, regardless of what they are. Defend those that are defensible, period.

4. Assuming we can't do better at animal welfare. Agriculture is about evolving practices.

5. Attacking in a negative, critical manner everyone who disagrees with you. We get angry very easily and that generally means we are not comfortable with what we are doing, so we have to defend it at the top of our lungs.

6. Not being willing to listen because we are so busy responding.

7. Assuming that the lunatic fringe is the general public. We spend way too much time focusing on lunatics and not working with the public.

8. Being reactive rather than proactive.

9. Assuming that because someone disagrees with you they are stupid, evil or both. Good people can look at the same issue differently.

10. Not working hard enough to build coalitions that include the public (consumers). Most of our coalition efforts are focused on bringing agricultural groups together. There aren't enough of us, and we don't represent enough votes.

Daley's list also includes two bonus points in advising producers what not to do:

Bonus 1: Criticizing or mocking any animal production system that is not "conventional." There is room in agriculture for lots of different methods of production. Let the market determine their success rather than hoping for them to fail.

Bonus 2: Trying to lead a parade without seeing if anyone is following. Have you asked producers about this issue? I have surveyed more than 200 cattlemen in three locations, and 90%-plus of them say, "animals have the right to be treated humanely and ethically."