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### Integrating Crop, Livestock and Irrigation Technologies to Ensure Food Security and Environmental Quality

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## Symposium 3

# Integrating Crop, Livestock and Irrigation Technologies to Ensure Food Security and Environmental Quality

## STAKEHOLDERS AND DECISION-MAKERS CONFERENCE

### Panel

**Jerry Hatfield**, *Director, Soil Tilth Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture*

**Don Batie**, *President, Batie Cattle Company, and President, Dawson County Farm Bureau*

**Jon Holzfaster**, *Chairman, Nebraska Corn Board*

**Mike Kelly**, *Rancher and Member, Sandhills Task Force*

### Moderator

**Rick Koelsch**, *Associate Professor, Biological Systems Engineering, University of Nebraska-Lincoln*

The metropolitan areas of Denver and Omaha sit like bookends for the Platte River Basin and High Plains region. In the 500 miles between these metropolitan areas lies a vast, almost completely rural region where farming and ranching are the mainstays of the economy and the culture. Agriculture is not just the primary industry; it is a way of life. This way of life is very vulnerable to changes in climate.

The perspectives of the people who work and live in this region are crucial to informing research on climate change. They are on the frontlines of climate change, as climate impacts and shapes every facet of their lives. In turn, because agriculture is in the business of sequestering and recycling carbon, the decisions and choices agricultural producers make in managing the natural resources in their care can have an impact on mitigating climate change. Most see themselves as stewards of the land and are motivated to pass their land on to the next generation in the best possible condition. But they also are driven by economics – they can't pass on the land if they can't hold on to it – and that means paying the mortgage every year. Research solutions and recommendations need to work economically for farmers and ranchers if they are expected to adopt them.

“The agricultural community in Nebraska is the part of our society that is going to be most heavily impacted by climate change, and it is also the important potential contributor to the solution,” said panel moderator Rick Koelsch, associate professor of biological systems engineering at UNL.



From left: Jerry Hatfield, Rick Koelsch

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*Farmers often are blamed for only making short-term decisions, “but I have to pay off the bank every year. I farm for the short term, but I look to the long term and what the consequences are.”*

Three of the panelists represented family farming and ranching operations. They included a fourth-generation farmer, a third-generation cattle rancher and a third-generation farmer. All are active in farm and ranch organizations, including the Farm Bureau, the Nebraska Corn Board and the Nebraska Sandhills Task Force. The fourth panelist brought the perspective of a federal research laboratory and was the chief technical author of the U.S. Climate Change Science Program report *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity*. Panel discussion centered on three main topics: the attitudes of the agricultural community toward climate change; the challenges, opportunities and impacts of climate change for agriculture; and how research can meet the needs of the agricultural community.

### Attitudes toward climate change

The participating farmers and ranchers expressed some skepticism about climate change, as they live by the weather every day and have managed extremes and changes over many years. They also are pragmatic. If climate change is happening, plans must be made to adapt to and mitigate the effects.

“We see climate get warmer and colder, get wetter, get drier. How much of these changes are due to long-term climate changes and how much is a short-term cycle? To me, that’s yet to be decided,” said fourth-generation farmer Don Batie.

Batie emphasized that farmers need to look at both the short- and long-term perspectives. Farmers are often blamed for only making short-term decisions, but decisions have to be made based on what will enable them to survive until the next year. “It may make more sense to do things differently if I was farming 10 or 20 years down the road,” he said. “But I have to pay the bank off every year. I farm for the short term, but I look to the long term and what the consequences are.”

The panelists agreed that the public and political perception is that climate change is occurring, and the agricultural community must approach the issue accordingly, said third-generation farmer Jon Holzfaster.

### Challenges, opportunities and impacts of climate change

In a semi-arid environment like the High Plains where agriculture is heavily dependent on irrigation, potential changes in precipitation and its effects on the water supply are a major challenge and impact of climate change, panelists said. They agreed that Nebraska’s greatest advantage in the global economy is having one of the world’s largest supplies of fresh groundwater for irrigation.

Drier winters, especially in Wyoming where the snowpack is the most important supply of water, have reduced surface water (irrigation) supplies in Nebraska reservoirs so severely that farmers have had to reduce irrigation use, Batie said. Hydropower and recreational uses also are limited. “We will be changing our irrigation practices. We already have and we will be doing more,” he said.

Rising energy costs are another challenge, said third-generation rancher Mike Kelly. Irrigation pumps run on electricity and diesel fuel, and prices for both are increasing. At the same time, higher temperatures and reduced rainfall mean more irrigation and increased costs. Kelly also expressed concern about wind power, acknowledging that it is an important source of renewable energy with high potential in Nebraska, but fearing that large-scale wind farms could alter the pristine nature of the Sand Hills.

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Jerry Hatfield from the ARS-USDA Soil Tilth Center emphasized the tremendous strain that uncertainty in seasonal weather is going to place on agriculture. “We haven’t seen anything yet in terms of the variability in climate that we can experience,” Hatfield said. In addition to variability in the wet/dry cycles, rising temperatures is another change that will have a huge impact on agriculture. Initially, yields of corn and other crops will increase with higher temperatures, but long-term scenarios projecting to 2050 show decreases in crop yields because of the effects of higher temperatures on pollination. Higher temperatures also have a negative impact on livestock, an aspect that has not received much attention yet, Hatfield said.

Rangeland studies have shown that increasing levels of atmospheric carbon dioxide cause forage quality to decline, Hatfield said. This could have a tremendous impact on ranching, as it may take more acres to sustain a cow-calf operation if forage quality decreases.

How should uncertainty about climate change be viewed? How should the overall system be managed? These are the big questions, Hatfield said. In looking at the seasonal variability in the climate, a major issue is the uncertainty and risk it causes – uncertainty in production and risk in terms of how crops are managed.

The farmers and the rancher on the panel said carbon sequestration payments could provide an alternative income source for farmers and ranchers and said it is important for the agricultural community to understand carbon credits and how producers can best participate in generating revenue from this source. Holzfaster pointed out again that economics always play a role. “Many of today’s carbon friendly activities haven’t been motivated as much by reducing carbon footprints as by an economic motivation that also has created carbon advantages. That needs to be considered,” he said.



From left: Jon Holzfaster, Don Batie,  
Mike Kelly

### Research needs of the agriculture community

The panelists agreed that accurate long-term predictions of precipitation and temperature are their greatest needs. “I would like to have an accurate projection of what the weather is going to be like for the next year, the next 10 years. That will help me do my long-term planning,” Batie said. Continued research on efficient use of water supplies also is critical, panelists said.

Hatfield emphasized the need to develop and utilize research-based risk management tools that allow producers to make field-scale decisions. Researchers must work with producers to develop farm-level decision systems that take all of the variables into account and develop ways to get useable information back to the producers quickly.

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The most common theme from the panel regarding research was summed up by John Holzfaster: “It’s important for those of us involved in production agriculture that research be done *with* us as opposed to being done *on* us.” Knowledge of the challenges and needs of agricultural producers is critical to designing effective, useful solutions.

Farmers and ranchers are often risk-averse, but many also are early adopters of technology and can bring a wealth of knowledge for framing research questions. Koelsch, the moderator, said, “If you can’t evaluate your research against a parameter such as Don Batie’s ‘I farm for the short term, I plan for the long term,’ then your research may not be answering the key questions that will impact the eventual use of the science you’re doing.”

The audience asked related questions about the best ways to engage ag producers in research and to deliver research information to them.

“I have not met a farmer yet who doesn’t appreciate visitors to the farm who ask good questions,” Batie said. “Those of you doing research on anything involving agriculture, I highly encourage you to make a number of farm visits.” Kelly agreed, pointing out that the Sandhills Task Force has worked with UNL on wildlife research on several ranches and will gladly connect researchers and ranchers.



From left: John Holzfaster, Don Batie,  
Mike Kelly, Rick Koelsch

Corn and livestock commodity groups are valuable organizations for disseminating research, education and administrative information to producers, Holzfaster said. Most farmers and ranchers also are connected to the Internet and use it to stay informed. “Every progressive farmer that I know is online, and I’ll guarantee you that UNL is one of my quick links because I go there all the time to check what the latest findings are, to see what they publish and put online,” Batie said.

But all agreed that Cooperative Extension remains the best conduit for research to reach the farm. Every county has an extension educator who knows local farmers and ranchers and is trusted by them.

“In working with the agricultural community, you’ve got to work through organizations they trust,” Koelsch said. “The extension service, the commodity groups are places where trust exists. And building collaboration and dissemination of science through organizations like that is critical to seeing your science implemented.”

### 100 years from now

Generational transfer – the transfer of a farm or ranch to the next generation of the family – was clearly a key issue for the panelists and one that is tightly linked to potential impacts of climate change. All view themselves as stewards of the land and as “premier environmentalists” with the greatest motivation to preserve its health and productivity and recognize the need to prepare for and adapt to

potential changes in climate. But generational transfer is not possible without economic survivorship, they said. Batie's family has been farming the same ground since 1872, when his great-grandfather broke the sod. "I'm sure that my great-grandfather would be proud that I'm still farming the same ground that he did. But you know what, he made his decisions based on what he needed to do to survive to the next year. He had to make decisions on how he could pay off his bills and feed his family this year."

Holzfaster agreed, urging scientists to be mindful of what is economically viable and realistic, not only for ag production, but also in terms of impacts on input costs and other economic aspects of production agriculture.

Mike Kelly spoke eloquently about the past 100 years in the fragile Nebraska Sand Hills. "If we look at this tremendous resource over the last 100 years, I think that it is in better shape today than it ever has been. I've had old neighbors tell me and I have read in books that 100 years ago you could track a coyote five miles through the Sand Hills because the grass was so thin. Today, whether it's due to a wetter cycle, or rotational grazing programs or programs that we've worked on with the NRCS (Natural Resources Conservation Service) or the university, definitely today that resource is in better shape. Now, I guess I'm proud of the Nebraska ranchers for taking care of that resource like they have been."

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### Recommended research needs

- Accurate long-term predictions of precipitation and temperature
- Improve the efficient use of water, especially in irrigation
- Develop research-based risk management tools that enable producers to make field-scale decisions
- Involve agricultural producers in research to ensure effective solutions are designed and will be adopted
- Involve commodity groups and agricultural extension system in dissemination of research results
- Communicate research results in understandable, easily accessible formats

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