Great Plains Climate Education

Central Great Plains Climate Change Education Partnership

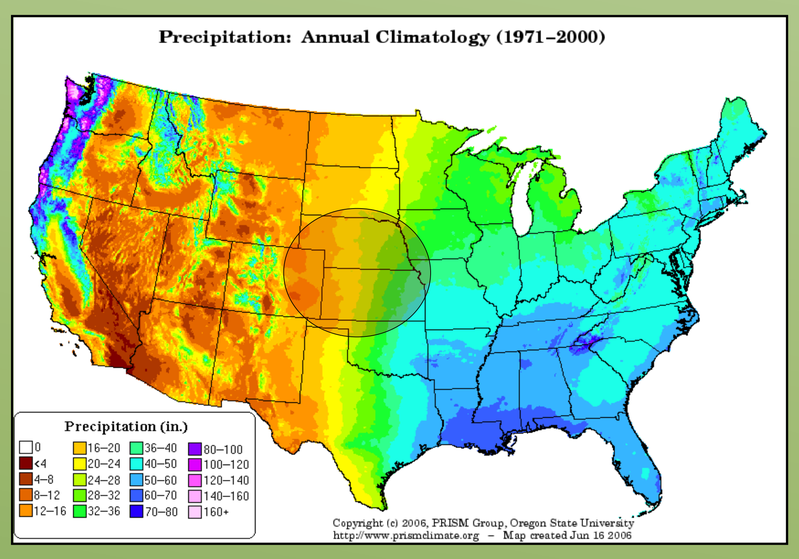
Building Trust with Agricultural and Rural Decision-Makers through Engaged Climate Educational Models in the Rural U.S. Central Great Plains

Kansas State University: *Benjamin L. Champion **(PI)**, Daniel L. Devlin **(Co-PI)**, Charles W. Rice **(Co-PI)**, John Harrington, Jr., Daniel W. Kahl, Jacqueline D. Spears, Timothy R. Steffensmeier, Shannon G. Washburn*

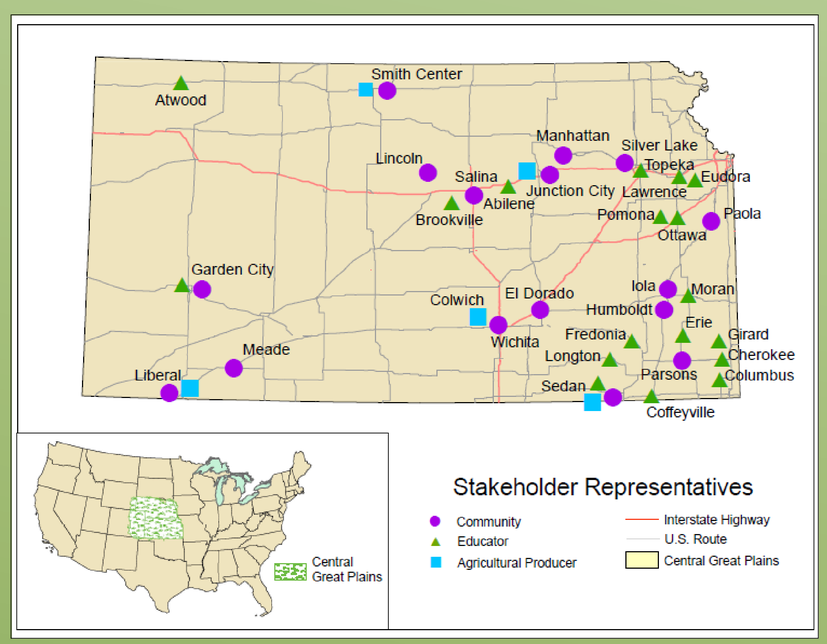
University of Nebraska-Lincoln: *Roger Bruning (Co-PI), Lisa M. PytlikZillig, Tarik L. Abdel-Monem, Qi Hu, Kenneth Hubbard, Gwen L. Nugent, Tapan B. Pathak, Martha Shulski, Natalie Umphlett*

The Central Great Plains Climate Education Partnership (CGP-CCEP) consists of climate science, learning science, and educational practitioner expertise at Kansas State University and the University of Nebraska-Lincoln. The team is developing ***climate education programming*** to serve the ***agricultural producers, rural communities, and rural schools*** of the Central Great Plains of the USA, in partnership with these very stakeholders and other agencies and organizations devoted to serving their needs. The economy of this part of the country is highly dependent on agriculture, and indeed is one of the world's major breadbaskets. Three annual crops, corn, sorghum, and wheat, which collectively account for 81 million hectares of agricultural land in the U.S., are concentrated in the Midwest and Central Great Plains. These crops are a mainstay for U.S. agriculture and account for $30.1 billion of agricultural production annually. The Central Great Plains also has been identified as one of a few regions around the globe that has a high degree of coupling of climate to soil moisture conditions, suggesting that any changes in precipitation will amplify climate feedbacks. With over 90% of its land area devoted to agriculture, the Central Great Plains will be profoundly affected by climate change.

Central Great Plains Climate



Focus Groups



The Partnership

Total of 19 faculty in 11 disciplines

Climate/Agriculture Expertise

- Agricultural Extension (KSU, UNL)
- Soil Carbon Center (KSU)
- High Plains Regional Climate Center (NOAA, UNL)
- KS EPSCoR on Climate and Energy (NSF funded, KSU, KU, WSU)
- Kansas Center for Agricultural Resources and Environment (KSU)

Learning and Education Expertise

- Center for Instructional Innovation (UNL)
- National Center for Research on Rural Education (UNL)
- Center for Science Education (KSU)

Public Engagement Expertise

- Office of Sustainability (KSU)
- Public Policy Center (UNL)
- Institute for Civic Discourse and Democracy (KSU)

Advisory Board Representatives (9): NOAA regional climate director, KS Water Office manager, KS Dept. of Education science program officer, Extension representatives (KSU, UNL), rural agriculture teacher, rural community college president, two agriculture producers

Great Plains Climate Change

Climate change is likely to increase uncertainty for managed ecosystems in the central Great Plains:

- **Temperature** – cold days have become less frequent and hot & humid days more frequent
- **Precipitation/water availability** – uncertainty, but with a decline in available soil water due to increased temperatures
- **Growing Season** – longer, with an earlier start, potential for greater variability in key times during crop growth cycle
- **Extreme weather events** – likely to increase – heat waves, droughts, and heavy rain events

All of these are likely to have adverse effects on crop yields. "Analysis of crop responses suggests that even moderate increases in temperature will decrease yields of corn, wheat, sorghum..." (Karl et al., 2009, p.72)

Karl, T. R., et al. (2009) ***Global Climate Change Impacts in the United States***. Cambridge University Press.

Key Themes

Focus groups from our Phase I partnership conducted with three sets of stakeholders (agricultural producers, rural community members, and agriculture/science educators representing future agricultural producers/rural community members) suggest these stakeholder group members were eager to learn more about climate and how it might change, but that their purposes, goals and attitudes toward the information vary widely (PytlikZillig et al., 2012). Different stakeholder groups want access to different types of information as well as how to use that information for different purposes. Moreover, they want increased access to data such that it allows them to decide for themselves how the data could be useful to them. Despite these differences, all the focus group stakeholders desire information that they can ***trust***, is ***frequently and quickly updated***, and ***easy to access***. Most of all, they want ***locally relevant*** information.

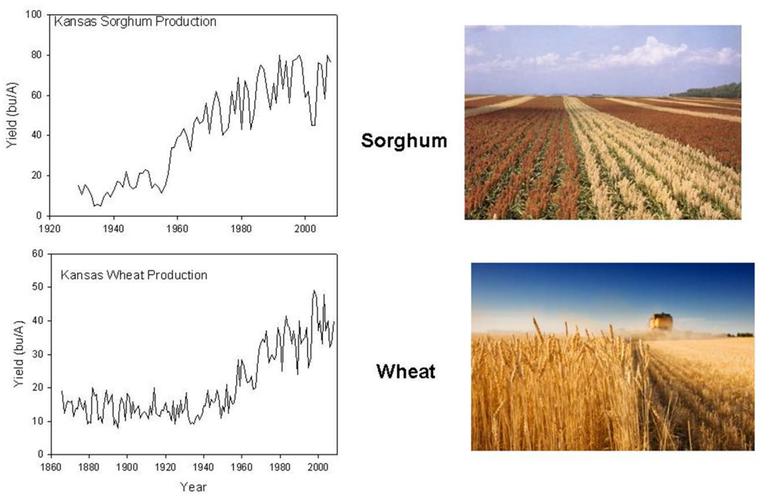
PytlikZillig, L. M., Steffensmeier, T., Campbell Hibbs, A., Champion, B., Hunt, E. D., Harrington, J., Jr., Spears, J., Umphlett, N., Bruning, R., & Kahl, D. (2012). Fostering climate change education in the Central Great Plains: a public engagement approach. International Journal of Sustainability, *Submitted for publication.*

Strategic Planning

In response to these challenges, the CGP-CCEP has engaged in two years of activities to develop a strategic plan for education programs to prepare Central Great Plains rural citizens to better understand climate and climate change. Activities have included:

- an extensive array of ***focus groups***, with transcriptions and analysis,
- engagement with an ***advisory board*** representative of our stakeholders and climate education expertise,
- two ***strategic planning retreats***,
- integration of ***formative and summative evaluation*** into the process,
- and a recently submitted ***NSF CCEP Phase II proposal*** to fund five years of programming.

Variation in Crop Yields



Crop yields have increased overall in recent decades, but so has sensitivity to weather variations. This graphic illustrates yield variability increases in recent years in large part due to weather variations.

Six Americas for Rural Central Great Plains

Contrary to assumptions that rural citizens of Kansas have high levels of skepticism about climate change, focus group participants self-defined as mostly cautious and concerned about the issue. The pattern of responses generally reflects the pattern at the national level (see right). Climate change is clearly an issue of importance to the rural and agricultural public.

Six Americas for USA

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National Science Foundation WHERE DISCOVERIES BEGIN

www.ksu.edu/cgp-ccep

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