

## **Foreword**

Agriculture in grassland environments is facing multiple stresses from shifting demographics, declining and fragmented agricultural landscapes, declining environmental quality, variable and changing climate, volatile and increasing energy costs, marginal economic returns, and globalization. Grassland landscapes today reflect the historical impacts of government policies and diverse environmental, economic, social, and cultural drivers. In the eastern United States, a portion of the land that was originally forested has been converted to crop land and then more recently during the past half century into pastures. The vast grasslands of the Great Plains in the western United States and Canada have been transformed into a mixture of grasslands, croplands, and urban centers during the past century, as well as concentrated regions of confined animal production systems following the industrial model that developed after World War II. Transformation of the North American landscape during the past several centuries has been dramatic, possibly even traumatic. Degradation of air, water, soil, and biodiversity has been prevalent throughout this industrial epoch, and we can now see that such extensive degradation may be diminishing the future viability of agriculture and the quality of life in rural areas.

The Farming with Grass conference was developed to bring together diverse stakeholders in grassland environments to (1) help assess the current condition of agriculture, (2) consider alternative production scenarios for grassland agricultural ecosystems, (3) identify key issues hindering the development of more sustainable systems, and (4) clarify the role of science and government policies in developing options for the future. Despite enormous uncertainty, human society must continue to rely on agriculture for its food, feed, fiber, and fuel, while maintaining and improving ecosystem function. Agriculturists increasingly face tradeoffs needed to manage for these different provisions. However, we oftentimes lack the tools to comprehensively assess short- and long-term costs and benefits of alternatives. Agriculturalists at all levels are called to identify new production, marketing, and policy approaches to simultaneously support economic viability, social equality, natural resource preservation, and biodiversity enhancement.

The Soil and Water Conservation Society held its Farming with Grass conference in Oklahoma City, Oklahoma, October 20 to 22, 2008, with 120 participants in attendance. The overall goal of the conference was to address the changing economic, societal, and environmental background facing grassland agriculture today and in the future, including climate variability and change, energy costs and sources, market prices for commodity crops, demographics, the emerging bio-energy industry, and evolving markets for local foods. Participants were encouraged to identify scientific knowledge, technological capacity, and policy instruments needed to enhance the capacity of individual land

owners, rural communities, researchers, and policy makers to help evaluate and create alternative production, environmental, economic, and social scenarios for a sustainable grassland agricultural future.

Following invigorating opening speeches by Dr. Gale Buchanan, USDA Under-Secretary for Research, Education, and Economics, and Dr. Frederick Kirschenmann, Distinguished Fellow of the Leopold Center for Sustainable Agriculture, participants toured the facilities and helped rededicate the Grazinglands Research Laboratory of the USDA Agricultural Research Service in El Reno, Oklahoma.

The program was grouped into the following five topic areas:

1. Status and trends in types of agricultural systems
2. Environmental, social, and economic benefits of mixed grassland landscapes
3. Factors driving changes in grassland environments
4. Assessment tools for monitoring and predicting changes in grassland agricultural systems
5. Science and policy needed to sustain agriculture in mixed grassland environments

The program consisted of invited and volunteered speakers and poster presenters to address issues facing grassland agriculture. Facilitated roundtable discussions helped to fill in gaps, target uncertainties, and build consensus as to how best meet the challenges facing grassland agriculture. The 16 papers contained herein represent the high quality of oral presentations at the conference.

The Farming with Grass program committee consisted of George Boody (Land Stewardship Project, Minneapolis, MN), Marvin Burns (Langston University, Langston, OK), Miguel Cabrera (University of Georgia, Athens, GA), Craig Cox (Environmental Working Group, Ames, IA), Martin Entz (University of Manitoba, Winnipeg, MB), Jurgen Garbrecht (USDA Agricultural Research Service, El Reno, OK), Andy Hopkins (Noble Foundation, Ardmore, OK), Jim Horne (Kerr Foundation, Poteau, OK), George Peacock (USDA Natural Resources Conservation Service, Fort Worth, TX), William Phillips (USDA Agricultural Research Service, El Reno, OK), David Porter (Oklahoma State University, Stillwater, OK), Jeanne Schneider (USDA Agricultural Research Service, El Reno, OK), Jeff Steiner (USDA Agricultural Research Service, Beltsville, MD), Brad Venuto (USDA Agricultural Research Service, El Reno, OK), Jason Warren (Oklahoma State University, Stillwater, OK), Larry Wright (Great Plains Resource Conservation and Development, Cordell, OK), Dewayne Johnson (Soil and Water Conservation Society, Ankeny, IA; conference manager), Jean Steiner (USDA Agricultural Research Service, El Reno, OK; conference organizer), and Alan Franzluebbbers (USDA Agricultural Research Service, Watkinsville, GA; program chair). Constance Neely (Heifer International, Little Rock, AR) provided excellent facilitation for small-group discussions throughout the event.

Appreciation is extended to conference sponsors, which included the following:

- Grazing Lands Conservation Initiative
- Samuel Roberts Noble Foundation
- National Center for Appropriate Technology
- Oklahoma Grazing Lands Conservation Association
- USDA Agricultural Research Service
  - Office of Technology Transfer
  - Grazinglands Research Laboratory
- USDA Cooperative State Research, Education, and Extension Service (National Research Initiative Agreement No. 2008-35101-19160)
- USDA Grazing Lands Conservation Effects Assessment Project

Expert opinions were provided by many busy individuals engaged in the process of manuscript review for the conference proceedings. Their efforts are greatly appreciated to help refine the quality of the contents presented. Reviewers included Jeff Arnold, Paul Bartholomew, George Boody, Miguel Cabrera, Craig Cox, Martin Entz, Charles Francis, Jurgen Garbrecht, Jerry Glover, Chuck Hassebrook, John Hendrickson, Andy Hopkins, Jim Horne, David Kissel, Sarah Lovell, Charles MacKown, Jerry Nelson, Mike Palmer, George Peacock, Bill Phillips, Mark Powell, Michele Schoeneberger, Jean Steiner, Brad Venuto, Jason Warren, and John Zhang. We thank Mark Anderson-Wilk and Oksana Gieseman at the Soil and Water Conservation Society for managing the production of this book.

**Alan J. Franzluebbbers**

USDA Agricultural Research Service

Watkinsville, Georgia

**Jean L. Steiner**

USDA Agricultural Research Service

El Reno, Oklahoma

**Dewayne Johnson**

Soil and Water Conservation Society

Ankeny, Iowa