

Charles W. Rice
University Distinguished Professor

Office: Department of Agronomy
Kansas State University
2701 Throckmorton Plant Sciences Center
Manhattan, KS 66506-5501

Telephone: (785)-532-7217
Fax: (785)-532-6094
E-mail: cwrice@ksu.edu

EDUCATION:

1983 Ph.D., University of Kentucky, Soil Microbiology
1980 M.S., University of Kentucky, Soil Science
1977 B.S., Northern Illinois University, Geography, Natural Environmental Systems

PROFESSIONAL EXPERIENCE:

2009-Present University Distinguished Professor
1998-Present Professor, Department of Agronomy, Kansas State University
2001-Present Director, Consortium for Agricultural Soils Mitigation of Greenhouse Gases
2004-2006 Research Assoc., Coop. Res. Centre for Greenhouse Accounting, Australia

1996-1997 Interim Director, KS Center for Agric. Resources & the Environment
1995 Visiting Professor, Univ. National de Mar del Plata, Balcarce, Argentina.
1993-1998 Associate Professor, Department of Agronomy, Kansas State University
1988-1993 Assistant Professor, Department of Agronomy, Kansas State University
1986-1988 Assistant Professor-Research (temporary), Department of Crop and Soil Sciences and Kellogg Biological Station, Michigan State University

PROFESSIONAL MEMBERSHIPS:

Soil Science Society of America	American Society of Agronomy
International Union of Soil Sciences	American Society of Microbiology
Ecological Society of America	American Geophysical Union
American Association for the Advancement of Science	

AWARDS:

Irvin E. Youngberg Award in the Applied Sciences, University of Kansas Higuchi Award. 2009
University Distinguished Professor, 2009
Environmental Quality Award, American Society of Agronomy, 2009
University of Kentucky Dept of Plant and Soil Science Distinguished Alumnus Award, 2009
USDA's Grand Challenge Award 2008 for paper on Vision of US Agriculture
Gamma Sigma Delta (KSU Chapter) Distinguished Faculty Award, 2008
Soil Science Research Award, SSSA 2006
Fellow, American Association for the Advancement of the Sciences, 2004
Fellow, Soil Science Society America, 2000
Fellow, American Society of Agronomy, 1999

COMMITTEES/PROFESSIONAL SERVICE:

National and International

Elected positions

President-Elect, Soil Science Society of America 2010.
AAAS Election Nominating Committee for Section O. 2008-2011
Chair, Soils, Food Security, and Public Health, International Union of Soil Sciences
2002-2006, 2006-2010
Board Rep., Div. S-3 Soil Biology and Biochemistry, Soil Sci. Soc. Am., 1999 – 2002.

S-3 Soil Biology and Biochemistry: Chair, 1996-1997

Appointed positions

National Academy of Science: Board on Agriculture and Natural Resources. 2009-2012.
Kansas Energy and Environment Policy Advisory (KEEP) group. Appointed by Gov. Sebelius. 2008-2010.
Midwest Governors Association Greenhouse Gas Accord Technical Advisory Committee. 2008-Present. Appointed by Gov. Sebelius. 2007-2009.
National Academy of Science: US National Soil Science Committee 2004-2010
Lead Author, Inter-governmental Protocol on Climate Change Working Group III Mitigation, 2004-2007.
U.S. Department of Agriculture: Agricultural Air Quality Task Force Committee. 2006-2008. Chair, Subcommittee on Greenhouse Gases
Chair, National Academy of Sciences, Frontiers in Soil Science Workshop, 2005-2006
SSSA Carbon Sequestration Position Paper (2000-2001)
Co-organized and chaired a SSSA Symposium in Informational Needs for Science and Environmental Policy, Oct. 2001, Charlotte, NC.

RESEARCH INTERESTS:

Soil microbial ecology; carbon and nitrogen cycling in terrestrial ecosystems; soil quality.

Our research findings on soil organic matter dynamics provide some innovative concepts on soil organic C and N formation and storage. We have developed procedures for fractionating soil organic matter. The two most labile fractions are more sensitive to environmental changes and management practices than the total soil organic matter. We are now using the stable isotopes of C to determine rates of turnover, loss, and accumulation of C from the atmosphere and different vegetation. The significance of these findings is that we will be better able to assess the long-term changes in soil organic matter as a result of climate, and grassland management. I am a director of the Consortium for Agricultural Soils Mitigation of Greenhouse Gases.

SIGNIFICANT RESEARCH GRANTS:

Processes affecting carbon fluxes of grassland ecosystems under elevated atmospheric CO₂. U.S. Dept. of Energy. C. E. Owensby, PI. Co-investigator with A. K. Knapp, J. H. Ham. 14 March 1995 - 14 March 1998. \$785,941 Rice \$100,749).

Controls on soil carbon retention under elevated atmospheric CO₂. DOE. Co-PI with J.D. Jastrow, R. M. Miller (Argonne National Lab.) and T.W. Boutton (Texas A&M Univ.). 1 July 1995 - July 1998. \$738,550. (\$30,000 KSU).

Belowground carbon allocation and cycling in tallgrass prairie and wheat ecosystems. DOE-NIGEC. PI. 1 July 1998 - 30 June 2002. \$174,521.

Biotic Interactions of Grassland Plants: Above- and belowground Linkages. Co-PI with David C. Hartnett, Timothy C. Todd, and Gail T. Wilson. 1 January 1999 - 31 December 2001. \$224,900.

Above- and Belowground Grazer-Mycorrhizal Interactions in Tallgrass Prairie: Effects on carbon and nitrogen partitioning. NSF. PI Charles W. Rice, Co-PI's Timothy C. Todd, and Gail W.T. Wilson. 1 April 2003 - 31 March 2006. \$524,000.

Evaluation of LIBS. USDA. PI. 1 July 2002 – 30 September 2008. \$160,000.

Consortium for Agricultural Soils Mitigation of Greenhouse Gases. Robertson Foundation. PI: C.W. Rice. 01 November 2006 – 30 October 2007. \$1,000,000.

Nitrogen Management to Reduce N₂O Emissions in No-till Systems: Measurement and Modeling. U.S. Department of Agriculture. PI: C.W. Rice. 01 January 2007 – 31 December 2009. \$427,659.

Development and Utilization of Sorghum as Feedstock for Biofuel Production. PI: D. Wang, CoPI's: S. Staggenborg, and C.W. Rice. Kansas Sorghum Commission. 01 July 2007 – 30 June 2010. \$79,780.

Providing Education in Face of Climate Change, Food and Energy Scarcity. PI: C.W. Rice. U.S. Dept. of Education FIPSE. 4 yr. \$257,000.

Understanding Climate Change in the Great Plains: Source, Impact, and Mitigation. PI: C.W. Rice, J. Harrington, and S.L.L. Hutchinson. NSF-EPSCoR. 5 yr. \$4,195,537.

Improving Soil Quality and Crop Productivity through Conservation Agricultural Practices in Cropping Systems of West Africa. V. Prasad, PI. Co-I. US AID. 1 October 2009-30 September 2014. \$821,571.

LIST OF PUBLICATIONS:

Selected Refereed Articles (80 total)

- Williams, M.A., C.W. Rice, and C.E. Owensby. 2000. Carbon and nitrogen dynamics and microbial activity in tallgrass prairie exposed to elevated CO₂ for 8 years. *Plant and Soil* 227:127-137.
- Williams, M.A., C.W. Rice, and C.E. Owensby. 2001. Nitrogen competition in a tallgrass prairie ecosystem exposed to elevated carbon dioxide. *Soil Sci. Soc. Am. J.* 65: 340-346.
- Baer, S.G., D.J. Kitchen, J.M. Blair, and C.W. Rice. 2002. Changes in ecosystems structure and function along a chronosequence of restored grasslands. *Ecological Appl.* 12:1688-1701.
- Paustian, K., B. Babcock, J. Hatfield, R. Lal, B. McCarl, S. McLaughlin, W.M. Post, A. Mosier, C. Rice, G.P. Robertson, N. Rosenberg, C. Rosenzweig, W.H. Schlesinger, D. Ziberman. 2004. Climate change and greenhouse gas mitigation: challenges and opportunities for agriculture. CAST Report, Ames, IA.
- Williams, J.R., R.G. Nelson, M.M. Claassen, and C.W. Rice. 2004. Carbon sequestration in soils with consideration of CO₂ emissions from production inputs: An economic analysis. *J. Environ. Management*. S264-S273.
- Rice, C.W., and J.S. Angle. 2004. A role for genetically modified organisms in soil carbon sequestration. p. 61-78. In N.J. Rosenberg, F.B. Metting, and R.C. Izaurralde (eds.) *Applications of biotechnology to mitigation of greenhouse warming*. Proc. St. Michael Workshop, St. Michaels, MD, 13-15 April 2003. Battelle Press, Columbus, OH. 213 pp.
- Williams, M.A., C.W. Rice, A. Omay, and C.E. Owensby. 2004. Carbon and nitrogen pools in a tallgrass prairie soil under elevated CO₂. *Soil Sci. Soc. Am. J.* 68:148-153
- Mikha, M.M., and C.W. Rice. 2004. Tillage and manure effects on soil and aggregate-associated carbon and nitrogen. *Soil Sci. Soc. Am. J.* 68:809-816.
- Koçyiğit, R., and C. W. Rice. 2004. Carbon dynamics in tallgrass prairie and wheat ecosystems. *Turkish J. Agriculture and Forestry* 28:141-153.
- Jastrow, J.D., R.M. Miller, R. Matamala, R.J. Norby, T.W. Boutton, C.W. Rice, and C.E. Owensby. 2005. Elevated atmospheric CO₂ increases soil carbon. *Global Change Biol.* 11:2057-2064.
- Mikha, M.M., C.W. Rice, and G.A. Milliken. 2005. Carbon and nitrogen mineralization as affected by wetting and drying cycles. *Soil Biol. Biochem.* 37:339-347.
- Dell, C.J. and C.W. Rice. 2005. Partitioning of nitrogen over five growing seasons in tallgrass prairie. *Ecology*. 86:1280-1287.
- McVay, K.A., J.A. Budde, K. Fabrizzi, M.M. Mikha, C.W. Rice, A.J. Schlegel, D.E. Peterson, D.W. Sweeney, and C. Thompson. 2006. Management effects on soil physical properties in long-term tillage studies in Kansas. *Soil Sci. Soc. Am. J.* 70:434-438.
- Pendell, D.L., J.R. Williams, C.W. Rice, R. G. Nelson, and S.B. Boyles. 2006. Economic feasibility of no-tillage and manure for soil carbon sequestration in corn production. *J. Environ. Qual.* 35: 1364-1373.

15. Pendell, D.L., J.R. Williams, D.W. Sweeney, R.G. Nelson, and C.W. Rice. 2006. Economic feasibility of carbon sequestration in claypan soil with alternative tillage systems and nitrogen sources for grain sorghum and soybean. *J. Am. Soc. Farm Managers and Rural Appraisers* 69:90-99.
16. Pendell, D.L., J.R. Williams, S.B. Boyles, C.W. Rice, and R.G. Nelson. 2007. Soil carbon sequestration strategies with alternative tillage and nitrogen sources under risk. *Rev. Agric. Eco.* 29:247-268.
17. Smith, P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, F. O'Mara, C. Rice, B. Scholes, O. Sirotenko, M. Howden, T. McAllister, S. Ogle, G. Pan, V. Romanenkov, U. Schneider, and S. Towprayoon. 2007. Policy and technological constraints to implementation of greenhouse gas mitigation options in agriculture. *Agriculture, Ecosystems and Environment*. 118:6-28.
18. Gehl, R.J. and C.W. Rice. 2007. Emerging technologies for *in situ* measurement of soil carbon. *Climatic Change* 80:43-54.
19. McCarl, B., F.B. Metting, and C.W. Rice. 2007. Soil carbon sequestration: Global potential, science needs, and land management impacts. *Climate Change* 80:1-3.
20. Dilling, L., D. Fairman, R. Mitchell, M. Lahsen, S. Moser, A. Patt, C. Potter, C. Rice, E. Skolnikoff, S. VanDeveer. 2007. How can we improve the application of scientific information to decision support related to carbon management and climate decision-making? pp. 49-56. In *State of the Carbon Cycle Report*.
21. Smith, P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, F. O'Mara, C. Rice, B. Scholes, O. Sirotenko, M. Howden, T. McAllister, S. Ogle, G. Pan, V. Romanenkov, U. Schneider, S. Towprayoon M. Wattenbach and J. Smith. 2007. Greenhouse gas mitigation in agriculture. IPCC.
22. Smith, P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, F. O'Mara, C. Rice, B. Scholes, O. Sirotenko, M. Howden, T. McAllister, S. Ogle, G. Pan, V. Romanenkov, U. Schneider, S. Towprayoon M. Wattenbach and J. Smith. 2008. Greenhouse gas mitigation in agriculture *Philosophical Transactions of the Royal Society (B)* 363: 789-813.
23. McKinley, D.C., C.W. Rice, and J.M. Blair. 2008. Conversion of grassland to coniferous woodland has limited effects on soil nitrogen cycle processes. *Soil Biol. Biochem.* 40:2627-2640.
24. Fabrizzi, K., C. W. Rice, T. Amado, J. Fiorin, P. Barbagelata, and R. Melchiori 2008. Mechanisms of soil organic matter stabilization in temperate and tropical soils: Effect of native and agroecosystems. *Biogeochem* 92:129-143.
25. Wilson, G.W.T., CW. Rice, M.C. Rillig, A.C. Springer, and D.C. Hartnett. 2009. Arbuscular mycorrhizal fungal abundance controls soil aggregation and carbon sequestration. *Ecology Letters* 12:452-461.
26. White, P., and C.W. Rice. 2009. Tillage effects on microbial and carbon dynamics during plant residue decomposition. *Soil Bio Biochem.* 73 (1): 138-145.

Book Chapters (17 total)

1. Rice, C.W., and C.E. Owensby. 2000. Effects of fire and grazing on soil carbon in rangelands. p. 323-342. *In* R. Follet et. al. (ed.) *The potential of U.S. grazing lands to sequester carbon and mitigate the greenhouse effect*. Lewis Publishers, Boca Raton.
2. Rice, C.W. 2002. Organic matter and nutrient dynamics. p. 925-928. *In* Lal, R (ed.). *Encyclopedia Soil Science*. Marcel Dekker, Inc., New York.
3. Rice, C.W. 2005. Carbon cycling in soils: Dynamics and management. p. 164-169. *In* Hillel, D. (ed) *Encyclopedia of soils in the environment Science*. Elsevier Ltd., Oxford, U.K.
4. Izaurrealde, R.C., and C.W. Rice. 200x. Methods and tools for designing pilot soil carbon sequestration projects. *In* R. Lal (ed.). *Carbon Sequestration in Latin America*. Taylor & Francis, Boca Raton, FL. (in press).

5. Rice, C.W., K.P. Fabrizzi, and P.M. White, Jr. 2007. Benefits of soil organic carbon to physical, chemical and biological properties of soil. pp. 155-162. In Kimble, J.M., C.W. Rice, D. Reed, S. Mooney, R.F. Follett, and R. Lal. 2007. Soil Carbon Management: Economic, Environmental and Societal Benefits. Taylor and Francis.