Keith L. Kline

Research Staff, Environmental Science Division Phone: 865-574-4230
Climate Change Science Institute and Center for Bioenergy Sustainability Email: klinekl@ornl.gov
Oak Ridge National Lab, Oak Ridge, TN 37831 http://climatechangescience.ornl.gov/content/keith-l-kline

Education

Year	Degree	Major	Institution
2000	M.Ed.	International Education	Framingham State College, MA
1979	B.S	Energy & Environment	SNR, University of Michigan, Ann Arbor

Appointments

- University of Tennessee Knoxville (UTK) Bredesen Center for Interdisciplinary Research and Graduate Education: Assistant Professor of Energy Policy, Planning, and Administration
- Tennessee Technological University (TTU Cookeville) Joint Faculty Appointment to the Office of Research

Professional Experience

2009-present, Senior Research Staff, Oak Ridge National Laboratory (ORNL), Environmental Science Division (1990-2009, Research Staff on intermittent assignment to US Agency for International Development)

2007-2009, Advisor to USAID Southern Africa Environmental Programs (under inter-agency agreement) and Research Staff, Environmental Sciences Division, ORNL

2004-06, Regional Natural Resources Program Leader and Project Officer; U.S. Agency for International Development (USAID), Regional Center for Southern Africa, Gaborone, Botswana

2000-04, Research Staff (Federal Energy Management Program, combined heat-power systems, alternative financing for energy efficiency and renewables) Engineering Science and Technology Division, ORNL

1990-2000, Team Leader, USAID Environmental Strategic Objective, Guatemala (on loan as full-time staff from ORNL Energy Division via inter-agency agreement with USAID)

1984-1990, Project Manager, USAID Energy & Environmental Programs: Regional Office for Central American Programs (ROCAP); Maya Biosphere Project (Guatemala), Central American Research Institute for Industry & Technology (renewables, energy efficiency), Disaster Recovery & Reconstruction (Peru)

1980-1984: Appropriate Technology for Rural Development; US Peace Corps & USAID, Ecuador

Selected Publications (2008-present)

- Kline KL and Dale VH (2008) Biofuels, causes of land-use change, and the role of fire in greenhouse gas emissions. *Science* 321:199.
- Kline KL, Oladosu GA, et al. 2008. Biofuel Feedstock Assessment for Selected Countries. ORNL/TM-2007/224. http://apps.ornl.gov/~pts/prod/pubs/ldoc10201_ornl_feedstock_potential_final_feb18.pdf
- Kline KL, Dale VH, Lee R, Leiby P (2009) In Defense of Biofuels, Done Right. *Issues Science & Tech* 25(3):75-84.
- Kline KL, Sanchez J. and Wallace W. 2009. *China-US Cooperation on Bioenergy R&D*. Bioenergy Consequences for Global Environmental Change: Proceedings of the Second Workshop of the China-US Joint Research Center for Ecosystem and Environmental Change, Beijing, October 15-17, 2008. Institute for a Secure and Sustainable Environment, University of Tennessee, Knoxville.
- Dale VH, Kline KL et al. (2010) Biofuels: Implications for Land Use and Biodiversity. Ecological Society of America special report: http://www.esa.org/biofuelsreports
- Kline, KL and MD Coleman, (2010) Woody energy crops in the southeastern United States: Two centuries of practitioner experience, *Biomass and Bioenergy*, 34(12).
- Kline, K. L., V. H. Dale, and A. Grainger. (2010) Challenges for Bioenergy Emission Accounting. *Science* e-letter (2 March 2010) http://www.sciencemag.org/cgi/eletters/326/5952/527#13024
- Kline KL, GA Oladosu, VH Dale, AC McBride (2011) Scientific analysis is essential to assess biofuel policy effects. *Biomass and Bioenergy* 35:4488-4491.
- Dale, VH, KL Kline, L Wright, R Perlack, M Downing, RL Graham. (2011) Interactions Between Bioenergy Feedstock Choices and Landscape Dynamics and Land Use. Ecological Applications 21(4):1039-1054

- Oladosu G, Kline KL et al., (2011) Sources of Corn for Ethanol Production in the United States: A Review and Decomposition Analysis of the Empirical Data. *Biofuels, Bioprod. & Bioref*. 5:640-653
- Dale VH, Efroymson R, Kline KL (2011) The land use–climate change–energy nexus. Landscape Ecol. 26 (6), 755–773 [DOI 10.1007/s10980-011-9606-2]
- Kline K, E Parish, N Singh, S Wullschleger, B Preston, M Keller, LR Lynd. (2011) Collaborators welcome: Global Sustainable Bioenergy Project (GSB). GLP NEWS No. 7 (7-8). The article reviews recent collaborations among ORNL, PNL and others in research supporting the GSB. http://www.globallandproject.org/newsletter.shtml
- Oladosu D, KL Kline, P Leiby, R Martinez, M Davis, M Downing, L Eaton. (2012) Global economic effects of the US biofuel policy and the potential contribution from advanced biofuels. *Biofuels* 3(6):703-723
- Dale VH, KL Kline, SR Kaffka, JWA Langeveld. (2012) A landscape perspective on sustainability of agricultural systems. *Landscape Ecology* 28(6):1111-1123
- Efroymson RA, VH Dale, KL Kline, AC McBride, JM Bielicki, RL Smith, ES Parish, PE Schweizer, DM Shaw. 2013. Environmental indicators of biofuel sustainability: What about context? *Environmental Management* 51(2):291-306
- Dale VH and KL Kline (2013) Issues in using landscape indicators to assess land changes. *Ecol. Indicators* 28.
- Kline KL et al. (2013) Cultivated hay and fallow/idle cropland confound analysis of grassland conversion in the Western Corn Belt. Letter published in *PNAS* (June 10, 2013)
- Parish ES, Kline KL et al. (2013) Comparing Scales of Environmental Effects from Gasoline and Ethanol Production. *Environmental Management* 51(2):307-338
- Dale VH, KL Kline et al. (2013) Communicating about bioenergy sustainability. *Environ. Mgmt.* 51(2)
- Oladosu GA and Kline KL. (2013) "A dynamic simulation of the ILUC effects of biofuel use in the USA." *Energy Policy*. 61(C): 1127-1139
- Dale, VH and KL Kline. (2013) Modeling for integrating science and management. Pages 209-237 (book chapter) In D.G. Brown, D. T. Robinson, N. H. F. French, and B.C. Reed (editors), *Land Use and the Carbon Cycle: Advances in Integrated Science, Management, and Policy*, Cambridge University Press
- Dale, VH, RA Efroymson, KL Kline, MH Langholtz, PN Leiby, GA Oladosu, MR Davis, ME Downing, MR Hilliard. (2013) Indicators for assessing socioeconomic sustainability of bioenergy systems: A short list of practical measures. *Ecological Indicators* 26: 87-102
- Kang S, Surendran Nair S, Kline KL, Nichols JA, Wang D, Post WM, Brandt CC, Wullschleger SD, Singh N, Wei Y. (2013) Global simulation of bioenergy crop productivity: analytical framework and case study for a perennial bioenergy crop, switchgrass. *GCB Bioenergy* 6(1), 14–25
- Dale B, Anderson J, Brown R, Csonka S,…Kaffka S, Kline KL…Wang M. (2014) Take a Closer Look: Biofuels Can Support Environmental, Economic and Social Goals. *Environmental Science & Technology* 48(13): 7200-7203
- Msangi S, Kline KL, Wood J, et al. 2015. Workshop on Biofuels and Food Security Interactions. Report of the Scientific Committee; Workshop held 19-20 November 2014. International Food Policy Research Institute, Washington. D.C. (Kline prepared and submitted a Draft Workshop Report to BETO Dec 2014; final report based on Kline draft and other input was posted on IFPRI website May 2015).
- Kang S, Wang D, Nichols JA, Schuchart J, Kline KL… (2015) Development of mpi_EPIC Model for Global Agroecosystem Modeling *Computers and Electronics in Agriculture 111 (2015) 48–54*
- Souza GM et al., (eds.) (2015) Chapter 9, "Land and Bioenergy" in Scientific Committee on Problems of the Environment (book) *Bioenergy & Sustainability: bridging the gaps*. SCOPE 72. Paris
- Dale VH, Parish ES, Kline KL (2015) Risks to global biodiversity from fossil-fuel production exceed those from biofuel production. *Biofuels, Bioproducts & Biorefining* Biorefining 9(2):177-189
- Kline KL, Mayer AL, Martinelli FS, Medeiros R, Oliveira COF, Sparovek G, da Silva Walter AC, Venier L. (2015) Bioenergy and biodiversity: Key lessons from the Pan America Region. Env Mgmt 56:1377-1396.
- Dale VH, RA Efroymson, KL Kline, and M Davitt (2015) A framework for selecting indicators of bioenergy sustainability. Biofuels, Bioproducts & Biorefining 9(4):435-446
- Woods J, Lynd LR, Laser M, Batistella M, de Castro D, Kline KL, Faaij A. (2015). Chapter 9, "Land and Bioenergy" in Scientific Committee on Problems of the Environment (SCOPE), *Bioenergy & Sustainability: bridging the gaps*. SCOPE 72. (Souza GM, Victoria RL, Joly CA and Verdade M, editors) Paris, France and Sao Paulo, Brazil. ISBN: 978-2-9545557-0-6. Available from: http://bioenfapesp.org/scopebioenergy/index.php

- Dale VH, Kline KL, Marland G, Miner RA (2015) Ecological objectives can be achieved with wood-derived bioenergy. Frontiers in Ecology and the Environment. 13(6): 297-299
- ISO 13065 (2015) Sustainability Criteria for Bioenergy. [Kline led international editing committee and contributed as coauthor. http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=52528
- IEA Bioenergy (2015) Mobilizing Sustainable Bioenergy Supply Chains - Synthesis Report, Chapter 5, Lignocellulosic crop supply chains (Dimitriou, Kline, Berndes et al.). Dimitriou I, Kline KL, Berndes G et al. November, 2015) Inter-Task Project Synthesis Report (editor: C.T. (Tat) Smith). Study, commissioned by IEA Bioenergy Executive Committee and completed with cooperation between IEA Bioenergy Tasks. 180 pages. http://www.ieabioenergy.com/publications/mobilizing-sustainable-bioenergy-supply-chains/
- Dale VH, KL Kline, MA Buford, TA Volk, CT Smith, I Stupak. 2016. Incorporating bioenergy into sustainable landscape designs. Renewable & Sustainable Energy Reviews 56:1158-1171.
- Efroymson RA, Kline KL, Angelsen A, Verburg PH, Dale VH, Langeveld JWA, McBride A (2016) A causal analysis framework for land-use change and the potential role of bioenergy policy. *Land Use Policy* (59) 516–527 http://dx.doi.org/10.1016/j.landusepol.2016.09.009
- Kanter DR, Musumba M, Wood SLR, Palm C, Antle J, Balvanera P, Dale VH, Havlik P, Kline KL, Scholes RJ, Thornton P, Tittonell P, Andelman S. 2016. Evaluating agricultural trade-offs in the age of sustainable development Agricultural Systems.
- Kline KL, Msangi S, Dale VH, Woods J, Souza G, Osseweijer P, Clancy J, Hilbert J, Johnson F, McDonnell P, Mugera H (2016) Reconciling food security and bioenergy: priorities for action. GCB-Bioenergy. http://onlinelibrary.wiley.com/doi/10.1111/gcbb.12366/full
- Dale VH, Parish ES, Kline KL. (2016) Lessons from the Forest Pages 18-22 in World Biomass. DCM Productions, United Kingdom. Http://www.dcm-productions.co.uk/flippages/flipbook/index.html?page=1
- Koponen K, Soimakallio S, Kline KL, Cowie A, Brandão M (submitted) Choice of reference system when quantifying climate effects of bioenergy. Global Change Biology-Bioenergy
- Dale VH, Kline KL. (In press) Interactive Posters: A valuable means for enhancing communication and learning about productive paths toward sustainable bioenergy. Biofuels, Bioprod. Bioref.
- U.S. Department of Energy. 2017. Billion-Ton Report: Advancing Domestic Resources for a Thriving Bioeconomy, Volume 2: Environmental Effects of Select Scenarios. Efroymson, Langholtz, Johnson, Stokes (Eds.) Oak Ridge National Laboratory, Oak Ridge, TN. 642p. doi 10.2172/1338837. Chapter 3: Kline KL, Davis M, Dunn J, Eaton L, Efroymson RA. "Land Allocation and Management: Understanding Land-Use Change (LUC) Implications under BT16 Scenarios" https://www.bioenergykdf.net/billionton2016vol2

Selected Synergistic Activities

- 2009-present, Center for Bio-Energy Sustainability, ORNL http://www.ornl.gov/sci/ees/cbes/
- Contributing member of the American Society for Testing and Materials (ASTM) International/ANSI, Committee E48 on Bioenergy and Industrial Chemicals from Biomass www.astm.org/COMMITTEE/E48.htm
- Collaborate to improve emission accounting, analysis of resource potential, and indirect effects on land for International Energy Agency Bioenergy www.ieabioenergytask43.org/
- Technical advisor, International Organization for Standardization (ISO). Led international editing committee for development of ISO 13065, Sustainability Criteria for Bioenergy (2010-2015).
- Science Advisor and organizer for international forum on interactions between biofuels and food security: http://www.ifpri.org/cdmref/p15738coll2/id/129175/filename/129386.pdf
- Collaborating partner in the Global Sustainable Bioenergy (GSB) and Latin American, Caribbean and Africa (LACAf) projects for mutually beneficial biofuel and food production (2010-16).
- Served by invitation on the Expert Work Group on Land-Use Change for the California Air Resource Board (CARB) Low-Carbon Fuel Standard; Sacramento, California (2009-11).
- Reviewer for scientific journals i.e.: Proceedings National Academy of Sciences (PNAS–USA); Frontiers in Ecology and the Environment; GCB-Bioenergy; Energy; Sustainability and Society; Environmental Modeling and Software; Environmental Impact Assessment Review; Biofuels, Bioproducts & Biorefining (Biofpr), etc.