

Bioenergy, Sustainability, and Land-Use Change Report Oak Ridge National Laboratory (ORNL) May 2014

Publications and Reports:

Dale B, Anderson J, Brown R, Csonka S, Dale V, Herwick G, Jackson R, Jordan N, Kaffka S, Kline K, Lynd L, Malmstrom C, Ong R, Richard T, Taylor C, Wang M (Submitted) Take a Closer Look: Biofuels Can Support Environmental, Economic and Social Goals. *Environmental Science & Technology*.

Dale VH, Parish ES, Kline KL (Submitted) Mapping risks to global biodiversity: Comparing biofuel to fossil fuel production. *Energy & Environmental Science*.

Langholtz M, Webb E, Preston B, Turhollow A, Breuer N, Eaton L, et al. Advancing Climate Risk Management for the U.S. Cellulosic Biofuels Supply Chain. *Clim Risk Manag*. In press.

Langholtz MH, Eaton LM, Turhollow A, Hilliard MR. 2013 Feedstock Supply and Price Projections and Sensitivity Analysis. *Biofuels Bioprod Biorefining-Biofpr*. In press.

ORNL Presentations:

May 12-15 – Rebecca Efrogmson and Natalie Griffiths presented at the Symposium on Forestry Best Management Practice (BMP) Effectiveness in the Eastern U.S. in Blacksburg, VA. Rebecca’s presentation, coauthored with Virginia Dale, was entitled “Evaluating best management practices for environmentally sustainable bioenergy production.” Natalie Griffiths presented a talk titled “Assessing BMP effectiveness for woody biomass production for bioenergy in groundwater-dominated Coastal Plain watersheds.”

May 15 – Nate Pollesch gave a presentation on “Mathematical Approaches to Bioenergy Sustainability Assessment” at the University of Tennessee.

May 20-22 –Several staff from ORNL participated in a workshop at the International Maize and Wheat Improvement Center (commonly called by its Spanish acronym CIMMYT for Centro Internacional de Mejoramiento de Maíz y Trigo). The focus was on collaboration opportunities between ORNL and CIMMYT. Virginia spoke on “Environmental and Socioeconomic Indicators for Sustainability.” Jay Gullledge spoke on “Environmental and Socioeconomic Indicators for Sustainability” and “Impact, Adaption and Vulnerability Research Science.” Raju Vatsavai and Suresh SanthanaVannan spoke on “Environmental Data Science Systems.” Bhudu Bhaduri spoke on “Knowledge Discovery Framework,” and Yarom Polsky spoke on “Sensors and Controls Research.”

Forum of the Center for Bioenergy Sustainability (CBES)

May 15 -The CBES Forum featured “Future Research on Sustainability for the DOE Bioenergy Technologies Office (BETO).”

Other ORNL Activities:

May 5- Dick Flavell of CERES visited ORNL and to talked Matt Langholtz, Virginia Dale, and others about opportunities and constraints or bioenergy production.

May 6 - ORNL (Dale, Davis, and Kline) and the University of Illinois at Urbana-Champaign (Jody Endres and Rayane Aguiar) participated in a webinar to discuss synergistic research involving standards for

bioenergy sustainability and market access (e.g., International Organization for Standardization- ISO PC248 and Biomass Market Access Standards-BMAS) and opportunities to build on collaborations with Brazil institutions on policies and measurements for sustainable bioenergy production including land use change research (e.g., Kline's participation in the Latin America Caribbean and Africa-LACAF-geospatial analysis project; and UIUC's land conversion work with the Energy Biosciences Institute-EBI).

May 6: The National Climate Assessment (NCA) was released ([see nca2014.globalchange.gov](http://nca2014.globalchange.gov)). The Global Change Research Act of 1990 requires a NCA assessment report at least every four years. Its production was led by the 13 Federal agencies that make up the U.S. Global Change Research Program, and is written by experts drawn from academia; local, state, and Federal government; and the private and nonprofit sectors. Contributions to the report were made from ORNL by Tom Wilbanks, Ben Preston, Steve Fernandez, Laurence Eaton, and Virginia Dale. The NCA found that, not only is global climate changing, but that the major source of change over the past 50 years has been burning of fossil fuels. The report points out recent trends in climate change and increased extreme disturbances and calls for reduced use of fossil fuels that continue to atmospheric concentrations of greenhouse gases. The Forest chapter points out the bioenergy could emerge as a new market for wood that could aid in the restoration of forests killed by drought insects and fire.

May 7 – Tim Thiess, Matt Langholtz and Virginia Dale attended the BETO quarterly review meeting in Washington, DC.

May 20 – Yetta Jager discussed a new approach to optimizing biodiversity and bioenergy with Dr. Sam Evens at the Energy Biosciences Institute at UC Berkeley. Plans are to implement a similar approach using BT2 assumptions and other refinements.

May 27 – Yetta Jager discussed possible future collaboration with Dr. Daniel Moriasi at the USDA Grazinglands Research Laboratory for the Pathways to Sustainability project/subtask. This laboratory operates two CEAP watersheds (Little Washita and Fort Cobb Lake) in Oklahoma at the front where irrigation becomes necessary for row crops. We would like to focus on the interface where irrigation becomes an economic driver for choosing switchgrass over winter wheat and/or other crops.

May 29 - Maggie Davis met with Dr. Adam French and Dr. William Capehart of the South Dakota School of Mines and Technology to discuss ORNL's land use change research and the connection to increases in extreme weather events and potential collaborations with the Climate Change Science Institute.

Upcoming ORNL Visits/Events:

June 3 – UT collaborator Zachariah Seiden will present, "A Water Quality Model Comparison of Potential Impacts from Bioenergy Crop Land Conversions: Switchgrass versus Hardwood" at the EWRI World Environmental & Water Resources Congress in Portland, Oregon. Implications of this modeling work suggest hardwood pine as a bioenergy crop may reduce pollutant load and may be an effective management practice for implication of a total maximum daily loads (TMDLs) in 303d listed water bodies in East Tennessee.

June 4-7 – Virginia Dale is an invited guest speaker at the 4th Pan-American Congress on Plants and Bioenergy in Canada.

June 17-20- Regis Leal of the Brazilian Bioethanol Science and Technology Laboratory will meet with ORNL (Dale, Davis, Kline) to discuss ongoing and future collaborations in bioenergy sustainability

research related to LUC and SOC. Dr. Leal will also present a CBES forum (June 19) on “Biomass Resources and Conversion Efficiency in the Cultivation and Processing of Sugarcane for Ethanol and Electricity” and will attend the upcoming workshop on “Incorporating Bioenergy in Sustainable Landscape Designs: Agricultural Landscapes” to be held in Argonne, Illinois.

June 23: Virginia Dale is invited to participate in the Conference of the National Socio-Environmental Synthesis Center (SESYNC) in Maryland on “Environmental Decisions and Scientific Knowledge: Strategy & Opportunities for the Knowledge-to-Action Community of Practice.”

June 24-26: Virginia Dale, Keith Kline, Yetta Jager and Matt Langholtz are invited to participate in second workshop on “Incorporating Bioenergy in Sustainable Landscape Designs: Agricultural Landscapes” to be held in Argonne, Illinois. Virginia serves on the steering committee for the workshop with Cristina Negri of Argonne National Laboratory and Kristen Johnson and Mark Elless of DOE.

July 22-25 – Virginia Dale, Keith Kline and Maggie Davis will give presentations at the upcoming Conference on Pan American Biofuels and Bioenergy Sustainability on July 22-25, 2014 in Recife, Brazil, that is being organized by the PanAm Research Coordination Network (RCN).

Oct 5-11 – Virginia Dale will speak at the International Union of Forest Research Organization meeting in Salt Lake City, Utah.

Oct 8-10 – The 3rd annual meeting of the Southeastern Partnership for Integrated Biomass Supply Systems (IBSS) will take place at the University of Tennessee Institute of Agriculture (UTIA) campus in Knoxville.