

Bioenergy, Sustainability, and Land-Use Change Report Oak Ridge National Laboratory (ORNL) June 2013

ORNL Publications:

Oladosu GA and Kline KL. In press. A Dynamic Simulation of the ILUC Effects of Biofuel Use in the USA. Energy Policy.

Dale VH, Kline KL, Kaffka SR, and Langeveld JWA. 2013. A landscape perspective on sustainability of agricultural systems. *Landscape Ecology* 28(6):1111-1123.

Langholtz M, Downing M, Graham R, Baker F, Compere A, Griffith W, Boeman R, Keller M. in press. Lignin-Derived Carbon Fiber as a Co-Product of Refining Cellulosic Biomass. In press. Society of Automotive Engineers (SAE) International Journal of Materials and Manufacturing.

Kline KL, Singh N, Dale VH. 2013. Cultivated hay and fallow/idle cropland confound analysis of grassland conversion in the Western Corn Belt. Letter published in PNAS Early Edition, June 10.

www.pnas.org/cgi/doi/10.1073/pnas.1306646110

ORNL Presentations:

June 4-5 - Mark Downing and Cliff Eberle were invited to present the **State of Technology of Lignin to Carbon Fiber** at the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy (EERE) *Renewable Low-Cost Carbon Fiber for Lightweight Vehicles Workshop* in Detroit, MI June 4-5, 2013. This Plenary presentation outlined the basis for utilizing lignin for both structural and non-structural carbon fiber production. This workshop was held by both the DOE Bioenergy Technologies Office and Advanced Materials Office in anticipation of continued discussions about biomass to materials.

June 12-13 – Jim Roberto, Maggie Davis, Keith Kline, Debo Oladosu, Shujiang Kang, Nagendra Singh, and Virginia Dale gave presentations to international participants in the “Global Sustainable Biofuels (GSB) Workshop on Future Sustainable Bioenergy Research” (described under international collaborations below). Workshop presentations are posted on the CBES website.

June 21 – Virginia Dale presented “Environmental and Socioeconomic Indicators for Sustainability of Energy Innovation” at the Association for Environmental Studies and Sciences (AESS) conference in the session on "Energy Poverty, Disruption and Scarcity" in Pittsburg, PA.

June 25 – Laurence Eaton presented Bioenergy Knowledge discovery Framework (KDF) at the Woody Biomass Utilization Group Meeting/Webinar in Washington, D.C.

June 27-28 – Laurence Eaton hosted a group of agronomists from the Sun Grant Regional Feedstock Partnership Sorghum team.

Other ORNL Activities:

June 3-11 –Maggie Davis and Keith Kline continued to support ISO (International Organization for Standardization) PC248 – Sustainability Criteria for Bioenergy. Davis contributed to the work on ecosystem services and Kline led the International Editing Committee which managed to get a revised Committee Draft standard distributed June 12, achieving a milestone on schedule. Comments and voting by National Mirror Committees are due by September 11, 2013 in preparation for the next plenary meeting to be held in Stockholm Sweden (September 30-October 4th).

June to August – Laurence Eaton is hosting 2 summer students. Sharon Smith from Walters State community college who will be collecting data for the Sun Grant Initiative Regional Feedstock Partnerships field. Justin Judy from Bluegrass Community & Technical College who will analyze ORNL's Biomass library of field trial and agricultural statistics to access the challenges facing growers and biomass facilities from extreme weather events.

June to August – Latha Baskaran is hosting Josh Monroe from the University of Tennessee who will help study the response of aquatic species to land-use change in the Tennessee River Basin.

June to August - Jamie Smedsmo is PhD student at the University of North Carolina who is working with Yetta Jager as a DOE Krell Computational Sciences fellow. Jamie will use the Soil Water Assessment Tool (SWAT) model to quantify the sustainability benefits (including production and water quality) of replacing winter wheat with a perennial grass harvested for bioenergy under future, more extreme climate conditions.

Zachariah Seiden (graduate student from the University of Tennessee) is working with Latha Baskaran, Esther Parish and Virginia Dale to adapt Soil and Water Assessment Tool (SWAT) to examine effects of conversion of land use from hay/pasture to switchgrass on water quality.

June 11-13 – Keith Kline, Maggie Davis and Lee Lynd (Dartmouth) organized a Global Sustainable Biofuels (GSB) Workshop on Future Sustainability Research at ORNL. In attendance were 2 representatives from Imperial College London (UK), 6 representatives from various universities in Brazil (College of Agriculture of Luiz de Queiroz/University of Sao Paulo, Federal University of Itajubá, State University of Campinas, and Institute of Agronomy of Campinas, Sao Paulo), 3 from Penn State, and 1 from University of Minnesota in addition to ORNL. Ten additional participants joined from Brazil, Egypt, Kenya, and South Africa via video conference to discuss collaborations between GSB and NEPAD including projects to illustrate how sustainable bioenergy can help achieve food security and other development goals. More information is available: <http://www.ornl.gov/sci/ees/cbes/workshop.shtml>

June 17 – Virginia Dale, Keith Kline and Debo Oladosu had a conference call with staff from the Food and Agriculture Organization (FAO) regarding their activities on considering food and energy security.

June 18-21 – Keith Kline, Virginia Dale and Debo Oladosu prepared review comments for BETO on the High Level Panel of Experts Report on Bioenergy and Food Security (HLPE Report #5).

June 19 – Esther Parish and Virginia Dale were interviewed on film about bioenergy sustainability by Bruce Burkhardt of the new Public Broadcasting Station (PBS) series, "This American Land." The interview segments may appear on an episode about biofuels expected to air in fall 2013.

June 19 - Davis organized an ISO PC248 webinar on the state of the science of indirect effects and Kline presented recent publications for consideration for the next report and annotated bibliography.

June 25-28 - Virginia Dale and Richard Mills attended a workshop at The Socio-Ecological SYNthesis Center) in Annapolis, Maryland (<http://www.sesync.org>), on "Using Human Interactions with Games to Value Ecosystem Services."

Upcoming ORNL Visits/Events:

July 31-Aug 1 – Mark Downing will be attending the U.S. Department of Energy Biomass 2013 Conference in Washington, D.C.

July 22 – Shahab Sokhansanj will be awarded the 2013 Standards Developer Award of the American Society of Agricultural and Biological Engineers (ASABE). This award is given specifically in recognition of his exemplary leadership and work in revision of ASAE S269.5, Densified Products for Bulk Handling – Definitions and Methods.

August 13-15 – Martin Schweitzer will be attending the International Energy Program Evaluation Conference in Chicago, IL.

August to January – ORNL (Melanie Mayes, Keith Kline, Maggie Davis and Shujiang Kang) will host Helio Joris, a PhD student from the Institute of Agronomy of Campinas, Sao Paulo Brazil. As a visiting researcher at ORNL for six months, Helio will collaborate with Mayes on techniques for assessing biological N fixation, and with other staff on studies related to nutrient requirements for bioenergy crops, global crop modeling, and sustainability indicator assessments.

Aug 21 - Matt Langholtz and Laurence Eaton will lead a webinar with North Carolina State University Forestry Extension on the topic of Projections of Agricultural Land Use for Bioenergy Production. The webinar will be hosted at <http://www.forestrywebinars.net/>. The audience will be natural resource professionals, private landowners, and the general public.

Sept 17-18 – Virginia Dale has been invited to attend a sustainable biofuels forum at the University of Minnesota.

Sept 25-27 – Virginia Dale has been invited to the China-US Joint Workshop on “Land Use Change: Turning challenges into Opportunities for Agricultural Sustainability” hosted by the Shenyang Agricultural University, Shenyang, China.

Sept 30-Oct 4 – Keith Kline and Maggie Davis will attend the International Organization for Standardization (ISO) PC 248 Plenary to review second committee draft of ISO 13065, Sustainability Criteria for Bioenergy.

Sept 30-Oct 3 - Rebecca Efroymson will present a poster on sustainability indicators for algal biofuels at the Algae Biomass Summit in Orlando, FL.

Oct 24-25 – Virginia Dale has been invited to present at the Transatlantic Trade in Wood for Energy: A Dialogue on Sustainability Standards and Greenhouse Gas Emissions Workshop in Savannah Georgia hosted by the Pinchot Institute for Conservation.

Nov 18 - Virginia Dale will present "Risks and Opportunities Related to Energy Use and Development in Tennessee" at the North American meeting of the Society of Environmental Toxicology and Chemistry (SETAC) in a session on "Ecological Risk and Impacts Relevant to Tennessee and the Region."