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**Education:**

PhD: **Mathematical Ecology** MS: **Mathematics** BS: **Mathematics**

**General Areas of Expertise:**

Environmental decision making, landscape ecology, and sustainability

**Short Bio:**

Virginia Dale is the Director of the Center for BioEnergy Sustainability at Oak Ridge National Laboratory and an adjunct professor in the Department of Ecology and Evolutionary Biology at the University of Tennessee. She has served on national scientific advisory boards for five agencies of the United States and several committees of the National Academies of Science. She received the Distinguished Landscape Ecologist award of the US International Association for Landscape Ecology in 2013. She was among the members of the international science community that contributed to the Intergovernmental Panel on Climate Change Scientific Assessment that in 2007 received with Al Gore the Nobel Peace Prize.

**Five Representative Publications:**

- 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. DOI: 10.1002/bbb.1562
- 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. <http://authors.elsevier.com/td/article/S1364032115014215>
- Kline KL, Msangi S, Dale VH, Woods J, Souza G, Osseweijer P, Clancy J, Hilbert J, Mugeru H, McDonnell P, Johnson F. 2017. Reconciling food security and bioenergy: priorities for action. *Global Change Biology Bioenergy* 9(3):557-576. doi: 10.1111/gcbb.12366.
- Dale VH, et al. (2017) Status and prospects for renewable energy using wood pellets from the southeastern United States. *Global Change Biology Bioenergy* 9: 1296-1305. doi: 10.1111/gcbb.12445. <http://onlinelibrary.wiley.com/doi/10.1111/gcbb.12445/full>
- Dale VH, Kline KL, Richard TL, Karlen DL, Beiden WW (In press) Bridging Biofuel Sustainability Indicators and Ecosystem Services through Stakeholder Engagement. *Biomass and Bioenergy*. <https://doi.org/10.1016/j.biombioe.2017.09.016>

**FEWSTERN Symposium 2017 Presentation Title and Abstract:**

Title: Environmental Challenges and Opportunities in the Food-Energy-Water Nexus

Abstract: The food-energy- water nexus has interrelated and overlapping fundamental elements. While consideration of each two-way linkage points to key influences, the interactions between all three factors form central themes of the nexus: good governance, infrastructure and technology, integrated crop management, ecosystem services, extreme events, and social costs and benefits. Good governance incorporates both political commitment and the institutional capacity to provide effective services and security under the rule of law and is essential for abundant clean water, food security, and sustainable energy. Investments in infrastructure and advances in technology are necessary for all parts of the system. Integrated crop management and production systems are necessary for efficient provision of food, feed, fiber, and energy feedstocks and helps minimize use of inputs such as fertilizer or pesticides that affect water quality. Diverse ecosystem services are influenced by the interactions among resource management, food, and sustainable energy. The occurrence of extreme weather events is unpredictable, but their intensity and frequency are expected to increase because of climate change. Resilience to extreme events is enhanced through diversified production systems and multiple suppliers with flexibility to adjust based on the linkages between resource management, food security, and sustainable energy production systems. Similarly, social benefits and costs are affected by all components of the nexus. By understanding the nexus and intentionally designing systems to promote beneficial linkages among abundant clean water, energy sustainability, and food security, we can enhance the resilience and adaptability of energy and food production systems and the coping mechanisms required in times of crisis.