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### A computer simulation model to optimize and assess sustainability of biofuel production

Sustainable fuel sources for biofuel plants benefit from science-based simulation of candidate crops as well as simulation of environmental costs and impacts of these crops production. A calibrated and validated simulation model for biofuel crop production can be used to optimize crop type, assess best areas for production, calculate needed water and fertilizer for production, and assess environmental impacts. The ALMANAC model has been developed and applied for all of these aspects. This talk will: 1. Describe the simulation model, 2. Describe the various crops, grasses, and woody plants that can be simulated by this model, 3. Demonstrate its application for environmental assessment, and 4. Give examples of its applications. Producing feedstock for biofuels is a process that also depends on finite resources. Land space and water are limited, and intensive farming for biofuel could have devastating effects on water quality and the fertility of agricultural land. The ALMANAC simulation model allows for the optimization of crop yield and for assessments of negative environmental impacts. It is responsive to soil, weather and crop management data, and allows for accurate, cost-effective and long-term crop planning. The model and associated practices are applicable to many regions of the world. A recent ALMANAC project provided the US Navy in Hawaii with a ready source of biofuel while bringing a number of benefits to Hawaii, allowing it to sustainably diversify its economy and achieve future energy security.

#### **Biography**

James Kiniry is a Research Agronomist with over 38 years' experience in basic and applied research related to simulation modeling. He is responsible for having developed the ALMANAC plant model which has been applied extensively to simulate plant growth and development. He quantified the key crop model input parameters for maize, sorghum, rice, wheat, potato, sunflower, canola, switchgrass, and several other warm-season and cool-season grasses.

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