

# Farm-Level Energy Feedstock Production Risk Analysis: A Comparison Using Quadratic and Semi-variance Risk Measures

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**Friday, March 7th**

**10:30 a.m.**

**301 Morgan Hall**



DEPARTMENT OF AGRICULTURAL  
ECONOMICS  
SEMINAR SERIES

Winter 2008



The potential impact on farm-level risk and return and the supply of cellulosic feedstocks is evaluated under four potential biomass farmer contract structures. A planting incentive provision to offset part of the cost of establishing switchgrass was included as an option for each contract specification. Both quadratic programming model and semi-variance programming model were applied with data from representative grain farm in Northwest Tennessee. The analysis highlights how contract specification and planting incentive affects risk and return for farmers, the amount and variability of biomass stocks supplied to the plant, and the costs of biomass materials at the plant gate for perennial biomass crops (such as switchgrass). In addition, the findings demonstrate that semi-variance measures and results produced by quadratic programming may not always be consistent according to a non-parametric comparison approach.