

Soil Quality: The Foundation for Natural Resource Conservation

Abstracts

BIOMASS PRODUCTION AND SOIL CARBON

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There is expanding interest in harvesting of crop biomass for energy. Crop biomass such as corn stover, wheat straw, soybean straw or other crop straws can be used as feedstock to support several bioenergy platforms (cellulosic ethanol, gasification or pyrolysis). There are potential benefits to using recently the fixed-C found in biomass for renewable energy compared to using fossil fuels. Biomass for bioenergy may be C-neutral, reduce greenhouse gas load and reduced dependency on foreign oil imports. However, there are environmental risks that must be addressed as the biomass industry develops. The primary roles of crop biomass are to protect the soil from erosion, and provide carbon inputs to support the below ground ecosystem and thus build and maintain soil organic matter (SOM)/soil organic carbon (SOC). Therefore, soil and water conservation benefits must be included in any biomass assessment to prevent long-term environmental damage as the nation addresses short-term energy problems. The big question is how much biomass must stay on the field to provide these ecosystem services. The literature provides initial estimates of the biomass inputs needed to maintain SOC, which can be considerably more than the amount needed to minimize erosion. Grain yield and harvest index can be used to estimate if sufficient biomass is available for protecting the soil resource, then by difference what may be available for other uses. Current research establishing biomass harvest guidelines and/or other management strategies that preserve the capacity of our soil to produce food, feed, fiber and fuel will be discussed.