Modeling Environmental Impacts of Bio-fuel Production

The short term vision for bio-fuel independence has focused on corn and soybean crops being used for ethanol and bio-diesel production. With increased crop demand we see an increase in crop production and the potential for nutrient, sediment and pesticide runoff into waters of the state.

By using the APEX and EPIC models, the University of Missouri has been able to estimate the environmental impacts within the Long Branch watershed. Soil erosion, nutrient runoff and atrazine runoff have been modeled to determine the potential increase of environmental concerns due to increased bio-energy crop production.

The methodology used for field analyses was to show the impact of crop on soil quality and water quality by using three crops on ten Missouri CRP soils. A multi-perspective analyses used five different crop rotations, two conservation practice levels, six major land resource regions, six pollutant analyses, and nutrient use.

These models quantify the environmental impacts, examine the distribution of environmental impacts with alternative weather, identify tradeoffs between energy production and environmental impacts and provide input for economic assessments at local, regional and national levels.

The models also were used to determine greenhouse gas emissions per gallon of fuel produced and the quantity of water used. These elements of environmental quality are generally overlooked in the discussions of bio-fuel production.

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