Biorenewable Systems
TSM/ABE 325

Impact of Energy Crops on Soil & Water Management

Introduction
Soil erosion is a major issue on many farms. With current corn and soybean practices there is a great deal of soil erosion during the standard growing season due to rain. As the soil is carried away by the rain fertilizer goes with it causing fertilizer infiltration and removing the fertilizer from the farm.
Perennial energy crops are crops that regrow every year and are grown for their energy value. These perennial energy crops can protect land that is prone to erosion. This will not only decrease the soil loss but also will reduce chemical runoff as less fertilizer is required to grow certain energy crops. The energy crops can be planted in areas of a field that are unsuitable for growing corn or soybeans allowing a farmer to produce crops in an area of land that was not worth farming with corn or soybeans.

Background Information
Currently 15% of land used to grow corn, in Iowa, is unprofitable. This land is usually poorer soils which erode easily and cannot hold leachable fertilizers.
Perennial crops do not require near the amount of fertilizer. They also do not require the land to be tilled each year.
Perennials can either be harvested as an energy crop or they can be left to help improve wildlife diversity and also act as a buffer strip to reduce nutrient leaching and soil erosion.

Constraints and Opportunities
One of the constraints of energy crops is the need for education about what they are and the benefit they provide. In a study done National Council on Competition and the Electric Industry many producers don’t agree with the statement that energy crops burn cleaner than non-renewable fuels.
Removal of the biomass causes direct contact between soil particles and raindrops which increase the level of erosion. Erosion causes the degradation of soil and water quality with the removal of soil organic matter and nutrients. This places them directly into the water source downslope.
This need to control erosion and provide education though can be a long term benefit for soil and water quality. It can make producers more aware of other areas of soil erosion. This also allows an easier transition to implement erosion controlling practices in other areas of their operation.

Potential Solutions
One potential solution to these constraints are cover crops. Cover crops are planted after the cash crop and terminated prior to the following crop. They help boost organic matter within soil which increases fertility and nutrient retention of soil.
Cover crops also help prevent erosion by reducing the direct contact that raindrops have with soil particles but also by their roots holding soil in place.
Planting perennial crops near creeks/streams can have the same benefit for soil and water management that cover crops do. They also help increase greenhouse gas mitigation, water quality, beneficial insects, and energy production.

References

Photo courtesy of United States Department of Energy Genome Program

Photo courtesy of Matt Helmers

Photo courtesy of the University of Arizona