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BMP Effectiveness Evaluation in a CEAP Watershed: What Have We Learned from Watershed Modeling?

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Abstract:

This study is part of a Conservation Effectiveness Assessment Project (CEAP) in the Lincoln Lake watershed located in the Ozark Highlands of Northwest Arkansas. The land use in the watershed is primarily pasture used for forage production and receives animal manure from a number of poultry houses located in the watershed. The primary water quality of concern is excess amount of sediment and phosphorus affecting the water quality of Illinois River. A number of best management practices (BMPs) have been implemented in the watershed since 1994. Concurrently, the watershed has also experienced a significant land use change, primarily from accelerated urbanization in the area.

We have developed a Soil and Water Assessment Tool (SWAT) model to evaluate impact of various BMPs in improving watershed quality. We have applied the model to evaluate the effectiveness of 171 management scenarios in reducing sediment and nutrient losses and to answer the following questions: (1) Do effectiveness of BMPs differ in improving water quality from pasture areas? (2) Do multiple BMPs, when applied concurrently, have synergistic effects in improving water quality or do they cancel the effects of each other? (3) Do the land use changes concurrent with BMP implementation in a watershed potentially mask the positive water quality benefits of BMPs? (4) How does the uncertainty in future climate conditions affect the water quality benefits that can be derived from BMPs? The detailed results related to these questions will be discussed in this presentation.

Impact Statement:

The project has evaluated effectiveness of various agricultural BMPs in improving water quality in a pasture dominated watershed. Successful outreach and extension activities have increased participation of stakeholders in implementing BMPs in agricultural areas.

Category: CEAP

Type of Presentation: Oral Presentation