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Session 1B (Agriculture and Water)

Kentucky Water Resources Research Institute, University of Kentucky

FEATHERED OR FOUR-LEGGED:
WORKING TOGETHER TO MANAGE MANURE IN KENTUCKY

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The Kentucky Agriculture Water Quality Act requires all farmers generating or utilizing nutrients on 10 acres or more develop and implement a nutrient management plan. The level of complexity of a nutrient management plan is case-specific; some operations require additional permits from the Kentucky Division of Water (KDOW). These rules and regulations are often confusing for farmers, resulting in violations of state law. The University of Kentucky College of Agriculture, Food, & Environment (UK-CAFE) partnered with the United States Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) Kentucky office, KDOW, Kentucky Division of Compliance Assistance (DCA), and the Kentucky Division of Conservation (DOC) to assist farmers and landowners with nutrient management planning. This partnership created a staff position in the UK-CAFE to work directly with producers in need of assistance to become compliant with state and federal regulations regarding the management of fertilizer, manure, and other sources of nutrients on the farm. The main goals of this project have been to 1) develop and deliver a nutrient management and water quality education program for technical staff and agricultural producers; 2) utilize nutrient management specialists to assist producers in the implementation of nutrient management plans to comply with the KY Agriculture Water Quality Act; and 3) bring technical field staff (NRCS, DOC, etc.), state regulators, and livestock producers to consistent understanding of nutrient management and agricultural water quality issues.

In the first year of the partnership over 30 individual nutrient management plans were developed, primarily focused on dairies. In addition, four, two-day workshops held across the state trained 66 staff from Conservation Districts, KDOW, UK-CAFE, and Kentucky Dairy Development Council to assist farmers. The workshops provided technical and hands-on activities, allowing the staff to create a sample nutrient management plan on their own. Post-workshop surveys indicated that over 88 percent of people agreed or strongly agreed they could assist landowners in developing a nutrient management plan. As a result, staff who attended a training can now provide local assistance to help producers develop a Kentucky Nutrient Management Plan, KY Ag Water Quality Plan, and apply for needed permits to be in compliance with state law. Staff also enhanced online planning tools and created and distributed six news articles for use in local Conservation District and Extension Service newsletters.

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THERE'S A PURPLE COW IN MY MS4

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There are approximately 38,000 beef producers in Kentucky. Their main goal is to make a profit, whereas, scientists and conservationists interested in the planning and management of land strive for sustainability. A sustainable beef operation would meet the needs of the present without compromising the ability of future generations to meet their needs. To many, this means an operation that has a strong conservation program, which protects natural resources and possibly regenerates natural resources. The contradictory goals of ecological conservation and economic existence between conservationists and beef producers creates a struggle. The challenge is to create a system that achieves both ecological and socioeconomic sustainability at the same time. This would create buy-in of conservation practices, by beef producers, and successful watershed projects.

A partnership has been developed between the Kentucky Beef Network (KBN) and the College of Agriculture to demonstrate a sustainable system. The site chosen was the Eden Shale Farm, in Owenton KY, that is managed by KBN. The goal of the project was to implement production practices that increase profits while at the same time benefitting the environment. The Best Management Practices (BMPs) implemented were designed to increase infiltration, while reducing runoff, erosion, and potential nutrient/pathogen contamination associated with production areas. One objective of the project was to increase producer acceptance and adoption of the concepts of demonstrated practices.

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FIELD SCALE CHARACTERIZATION OF SOIL HYDRAULIC CONDUCTIVITY AND ITS IMPLICATION FOR IRRIGATION MANAGEMENT

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Interest in irrigation is gaining momentum among Kentucky farmers. Improving irrigation strategies is of primary importance for conserving water during dry season mainly through avoiding over-irrigation and using available water resources in the most efficient way. The understanding of soil water infiltration behavior in different zones of agricultural production fields is crucial to develop effective field irrigation water management. Soil water infiltration is affected by hydraulic conductivity. The primary objective of this study was to characterize hydraulic conductivity at the field scale and analyze its influence on soil water flow.

Undisturbed soil cores (D= 8.4 cm, H= 6 cm) were collected from 10 soil profiles at five depths in a farmer's field in Princeton, Kentucky for measuring soil hydraulic conductivity. Saturated hydraulic conductivity (K_{sat}) was measured with a permeameter based on Darcy's law under constant and falling head conditions. K_{sat} in sampling locations was also estimated from pedotransfer functions and soil survey. The surface runoff and soil water infiltration were simulated using HYDRUS-1D. K_{sat} from different sources was used as an input hydraulic parameter in the simulation. Results from this research can be used as a reference to help farmers apply water in the right areas with the right amount and intensity at the right time while minimizing the potential risk of surface runoff.

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