University of Arkansas at Pine Bluff (UAPB)
Demonstration Farm, Swine Waste Treatment System and Constructed Wetland

Introduction:

The United States (U.S.) has approximately 330 million acres of agricultural land that produce nutritious food and other products. Approximately one billion tons of manure are produced each year by livestock. Surface water quality and odor associated with swine waste management is a key concern for most small farmers. The facility operation and agriculture activities are considered major contributors to water pollution. Some of the agricultural activities include farming activities such as animal confinement facilities, grazing, irrigation, land application, sedimentation, pesticides, and wastewater runoff, etc. Swine production has become one of the most important U.S. agricultural industries in recent years. Large amounts of swine waste cause environmental concerns such as greenhouse gases, odor emissions, and potential nutrient contamination to surface and ground waters. Currently, the anaerobic lagoon is the most widely used technology for swine waste treatment in the southwestern region of the U.S. This research will evaluate the water quality and odors associated with a swine waste treatment lagoon system on the UAPB demonstration farm. In addition, this research will investigate the effectiveness of wetland cells with various wetlands for farm pond water quality improvement.

Objectives and Methods

1. Evaluate the long-term effectiveness of a swine waste treatment lagoon for treating swine waste from a small farm, starting with the spring and summer months (April-July). Soil samples will be taken from the effluent sprinkler field area before and during effluent application. Fecal coliform in the samples will be analyzed with the MFC agar method.

2. Objective two will be accomplished by taking water samples from the UAPB farm pond, the water entry point of the created wetland (CW), and the discharge of the CW water samples will be analyzed for total nitrogen and total phosphorus using a Hach DR4000 spectrophotometer.

3. The constructed wetland vegetation will be rotated on a three year basis with vegetation harvest after the third year.

4. Model hill runoff from a small farm watershed using the Agricultural Policy Extension (APEX) model.

For Additional Information: Alicia R. Farmer, M.S., Agriculture Department, University of Arkansas – Pine Bluff, farmer_a@uapb.edu

Ed Buckner, Ph.D., Agriculture Department, University of Arkansas – Pine Bluff, buckner_e@uapb.edu