

UK Researchers Use GPS To Locate Sites Of Eroded Waterways In Fields

LEXINGTON, KY.

Reducing soil erosion in fields is important to maintaining the quality of the environment, and it could have economical benefits for farmers. However, determining areas in a field that are prone to soil erosion is time consuming and expensive for agencies that provide this service, such as the U.S. Department of Agriculture's Natural Resources Conservation Service.

In a recent study, researchers in the University of Kentucky College of Agriculture demonstrated that many eroded areas on a Kentucky farm were identifiable using digital terrain information.

UK Associate Professor Tom Mueller, and former UK graduate student Adam Pike used survey-grade global positioning system equipment to collect elevation data which they used to calculate the land's slope, landscape curvature and estimates of water flow from upslope areas for five different fields on a Shelby County farm. With the data, they developed an equation that accurately predicted locations where erosion from concentrated water flow was likely to occur.

They confirmed this research using a leave-one-field-out validation procedure, where they predicted the location of erosion in each field based on models developed from the other four fields. This project was funded by an USDA grant.

These techniques could help identify erosion-prone areas of a field so farmers can establish grassed waterways in these areas. Grassed waterways reduce erosion by reducing runoff which results in less sediment flowing into nearby water bodies.

Additionally, grassed waterways have economic benefits for farmers. Through the USDA's Conservation Reserve Program, farmers receive conservation payments for good environmental stewardship when they install waterways.

"Allowing erosion channels to form will result in reduced productivity over time," Mueller said. "Installing waterways in these areas reduces these yield losses."

Mike Ellis, the Shelby County farmer with whom Mueller worked on this project, saves additional input costs by programming his farm equipment to not plant, spray herbicides, or apply fertilizer in the grassed waterways. The grassed waterways also allow him to make time-

lier field operations.

This research is just a start. Mueller said USDA field visits are still needed to validate the location and determine the shape of potentially eroded areas. However, it could save USDA employees time by giving them a map that shows possible areas where erosion is high.

Running a survey-grade GPS system across every acre of farmland would be cost prohibi-



Erosion Predictor

tive. Mueller said more research is needed to determine if these techniques can be used with elevation data from the United States Geological Service and data obtained from light detecting and ranging (LIDAR) data as well as whether these models can be used to predict erosion across large geographic areas.

Pike now works for Photo Science in Lexington, where he processes LIDAR data collected from locations across the United States. Pike said the UK study could be expanded easily to use data on the Internet, and he hopes that a stand-alone application could be created with this approach. △



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