Title: Examining the Potential of Conservation Practices to Maximize Subfield Profitability and Environmental Benefits

Author: Haleigh Summers

Presentation Type: Oral

Abstract:

Research suggests that 5-15% of an average farm field in Iowa regularly has low yields due to soil properties and landscape position, resulting in lower profitability than the surrounding field area, often to the point of net financial loss (Muth, 2014). These chronically unprofitable areas may be opportunities for strategic conservation practice placement. Removing these unprofitable areas will reduce input costs in these low-yielding areas while allowing farmers to achieve higher degrees of profitability in the rest of the field (Brandes et al., 2016). However, while these unprofitable areas may make economic sense for conversion to conservation practices, it remains unclear if these locations are also the best opportunities to address resource concerns or enhance environmental benefits, such as reduced soil erosion and nutrient loss. For example, there may be fields where unprofitable areas are also areas of greatest resource concern, meaning that strategic placement of a conservation practice may be both economically and biophysically advantageous. However, the opposite may also be true, wherein unprofitable areas and needed areas to address resource concerns do not overlap. Those locations where overlap does not occur could benefit non-spatially determined environmental benefits, such as wildlife or pollinator habitat, depending more on notions of connectivity and overall conserved area rather than the landscape or soil position. *This proposed dissertation chapter seeks to answer the question: "do subfield opportunities for farmers to improve field-level financial outcomes serve as an incentive for conservation?"* To answer this question, and to understand what circumstances might lead to these situations, I will examine how often the least profitable areas of fields overlap with areas where a conservation practice could be placed to maximize spatially-determined environmental benefits.

I plan to use publicly available geospatial data and the GIS-based Agricultural Conservation Planning Framework (ACPF). Using the past five years of corn and soybean production cost and commodity price data, I will determine the breakeven Iowa Corn Suitability Rating (CSR2) value that identifies an area as unprofitable in an average year by county. I will use the ACPF tool to determine high-priority fields for runoff risk and erosion. In those fields, I will compare recommended conservation practice placement for various conservation practices versus areas where CSR2 ratings are below the county breakeven CSR2 rating. I will run the ACPF Financials Tool on both scenarios (biophysically placed vs. economically placed) to compare potential costs and potential nutrient reduction from each scenario and where overlap exists, if any. This research will provide insights into if subfield profitable areas are actually ideal placement for spatially-determined conservation practices and what possible financial incentives exist.