Abstract

*Introduction*

In Midwestern maize (*Zea-mays* L.)-based systems, planting an over-wintering cover crop such as rye (*Secale cereale* L.) following fall harvests of summer crops maintains continuous soil cover, offering numerous environmental advantages. However, while adoption of cover crops has increased over the past decade, on a landscape-scale it remains low. Identifying where agronomic research could be most impactful in increasing adoption is therefore a useful exercise. Decision analysis (DA) is a tool for clarifying decision trade-offs, quantifying risk, and identifying optimal decisions. Several fields regularly utilize DA frameworks including the military, industrial engineering, business strategy, and economics, but it is not yet widely applied in agriculture.

*Methods*

Here we apply DA to a maize-soybean [*Glycine max* (L.) Merr.] rotation using publicly available weather, management, and economic data from central Iowa.

*Results*

In this region, planting a cover crop following maize (preceding soybean) poses less risk to the producer compared to planting following soybean, meaning it may be a more palatable entry point for producers. Furthermore, the risk of reduced maize yields when planting less than 14 days following rye termination substantially contributes to the overall risk cover crops pose to producers, but also has significant potential to be addressed through agronomic research.

*Discussion*

In addition to identifying research priorities, DA provided clarity to a complex problem, was performed using publicly available data, and by incorporating risk it better estimated true costs to the producer compared to using input costs alone. We believe DA is a valuable and underutilized tool in agronomy and could aid in increasing adoption of cover crops in the Midwest.