Changes in farmer environmental knowledge: influences from information sources

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SOCIAL NETWORKS INFLUENCE KNOWLEDGE

Agriculture, as a system of production, has long been linked to environmental phenomenon. This has prompted social scientists to investigate how and why farmers choose specific crop management practices over others. Understanding the decision-making processes that underlie farmers' management of their land may reveal opportunities to mitigate adverse environmental impacts that emerge from collective agricultural activities. One area of focus has been to identify who else besides farmers can influence practice implementation. Social scientists have examined this idea of multiple actors influencing farmers' decisions under a social network approach, where the general hypothesis being tested is:

> **Farmers' use of information sources within their professional (social) networks can influence the practices they decide to implement.**

Information sources commonly examined within the American context include Extension educators and faculty members, chemical and seed dealers, crop consultants, government agencies (e.g. SWCD, USDA), growers' associations, and other farmers. Scholars have found that farmers' use of information sources vary depending on the management practice being considered.

CHANGES IN FARMER KNOWLEDGE

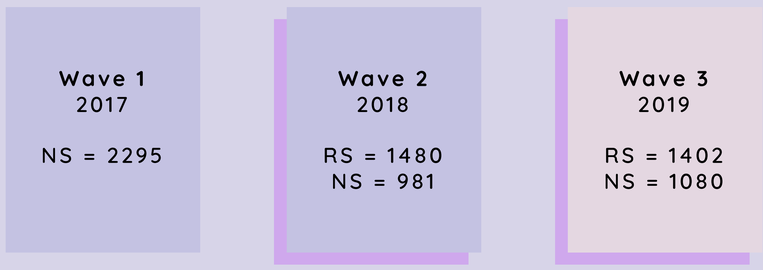
For this project, I am interested in identifying the extent to which farmers' knowledge and decision-making have changed as a result of their interactions with information sources – many of whom are directly responsible for the increased presence of automated and data-intensive technologies in American agriculture. Given this, the hypothesis I will test is:

> **Farmers' knowledge on agricultural processes and the environment increasingly reflect the epistemologies of the information sources they most frequently use.**

PRELIMINARY FINDINGS FROM THE PANEL FARMER SURVEY

Due to its longitudinal form, the Panel Farmer Survey (PFS) provides an opportunity for social scientists to investigate changes in farmer knowledge over time. Since its inception, the overall objective of the PFS has been to identify the drivers of crop management decision-making among farmers in the 'Corn Belt' region of the Midwestern United States.

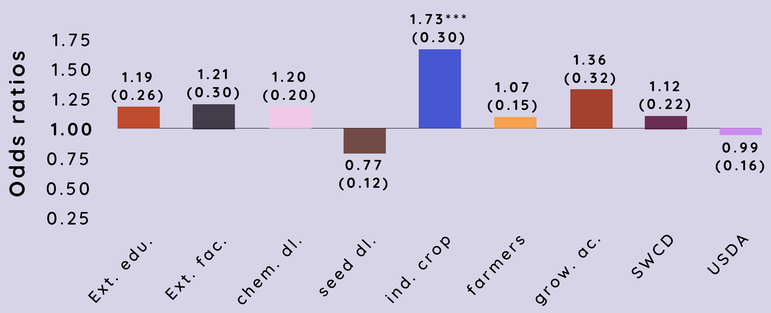
RESEARCH DESIGN: PANEL FARMER SURVEY



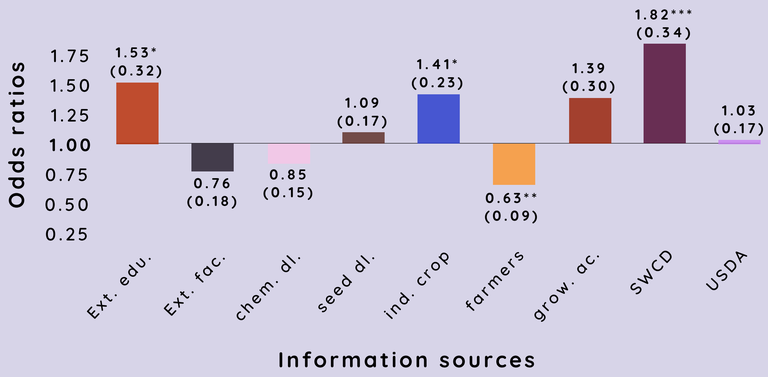
NS = new sample, RS = return sample
Participants from Illinois, Indiana, Michigan, and Ohio

Preliminary analysis of data from the PFS supports the idea that farmers' use of information sources is linked to knowledge about crop management practices, and varies depending on the practice being considered. For example, logistic regressions of farmers' high or low confidence in their knowledge of soil organic matter and cover crops against high or low information source use illustrates this variation (see Model 1 and Model 2).

MODEL 1: SOIL ORG. MATTER (N = 1,296)
Self-rated knowledge on building soil org. matter
Results in odds ratios, ***p < 0.001, **p < 0.01, *p < 0.05



MODEL 2: COVER CROPS (N = 1,293)
Self-rated knowledge on using cover crops
Results in odds ratios, ***p < 0.001, **p < 0.01, *p < 0.05



NEXT STEPS: INVESTIGATING FARMER KNOWLEDGE

My main objective is to use qualitative methods informed by a sociology of scientific knowledge framework to trace these changes to farmers' environmental knowledge more precisely. I will do this by conducting semi-structured interviews and completing a modeling activity with 10 to 12 research participants recruited from the PFS.

RESEARCH DESIGN

To collect data on how farmers conceptualize 'the environment' within their everyday work, I will use two instruments; excerpts from each are below.

Excerpt from interview instrument

- What environmental factors influence crop growth and crop yield?
  - Describe in detail how this happens.
  - How would you rank these factors in terms of importance or impact?

Excerpt from modeling activity instrument

- Using the materials (e.g. paper, pens, markers) provided, please show (e.g. draw a diagram, write a formula) how environmental factors influence crop growth and crop yield.
- Be prepared to discuss or convey in words:
  - How do you know what you know?
  - How confident are you in this model?