Assessing Conditional Probabilities of Adopting Conservation Practices of Kansas Farmers

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The marginal effect of a change in an explanatory variable on the conditional probability of adopting a given conservation practice can be given by:

\[
\frac{\partial P_{r_1}(I|M)}{\partial x_i} = \sum_{m} \frac{\partial P_{r_1}(m|I,M)}{\partial x_i} \cdot \frac{m}{P_r}
\]

The conditional probabilities and marginal effects may be useful tool to help determine what factors affect farmers' interest in intensifying conservation on-farm and what tools may be useful in promoting such activities.

### Results and Implications

Most studies focus on adoption of a single practice. They are interesting, but ignore potential complementarities or substitutability (i.e. dependencies) between practices. The joint framework implicitly takes account of this. The unconditional probability of adopting a practice was 59% for no-tiltage; 8.1% for crop covers; and 9.2% for use of manure.

- Land characteristics like susceptibility to soil erosion increase adoption of no-tiltage and of manure, but lower the likelihood of adopting cover crops.
- Interestingly, having crop insurance increases the probability of adopting cover crops by 4.2%, but lowers the probability of adoption of no-tiltage and use of manure by 2.0% and 1.7%, respectively.
- Participation in EQIP & CSP programs positively affects the adoption of cover crops and use of manure, but reduces the likelihood of adopting no-tiltage. This may be due to current programmatic focus.

The joint adoption framework allows one to examine the simultaneous adoption of bundles of practices, which can help assess factors that affect the intensity of adoption on-farm. But this does not pick up the potential sequential nature of adoption of piece-meal approach.

Farmers that are risk-averse, have a college education, raise livestock and/or live in areas more prone to drought are more likely to adopt no-tiltage and cover crops.

Farmers that have more land, rent more acres, and/or participate in EQIP and CSP are more likely to adopt no-tiltage and use of manure.

### Conclusions

Conditional probabilities of adopting practices may help find out what it would take to get people to increase the size of bundles of practices or adopt additional practices, based on complementarities with other practices. We examined two specific probabilities: C/N = 6.4% and M/N = 11.1%.

- It is of interest to see what can be pulled out of cross-sectional adoption studies, given time series information on the adoption of conservation practices is not usually readily available.
- Farmers who have already adopted no-tiltage are more likely to adopt cover crops if they are risk avoider, have a college education, and/or raise livestock. Farmers who already have no-tiltage are more likely to adopt usage of manure if they participate in EQIP/CSP; but less likely if they are a risk avoider, use irrigation or reside in Eastern KS.

The different types of marginal effects can provide valuable information for researchers, extension agents and conservation personnel. That is, marginal effects can help guide outreach efforts identifying factors or barriers to the adoption of conservation practices for intensification of conservation on-farm.