United States Department of Agriculture

Legacy Effects of Conservation Payments

Steven Wallander[a], Maria Bowman[a], Peter Beeson[b],
and Roger Claassen[a]

A collaboration of USDA-ERS[a] and
the Roger Tory Peterson Institute of Natural History[b]

Making the Most of Federal Data: Combining Data for Economic Analysis
AAEA Post-Conference Workshop
August 8, 2018

The findings and conclusions in this preliminary presentation have not been formally disseminated by the U. S. Department of Agriculture and should not be construed to represent any agency determination or policy. This research was supported by the intramural research program of the U.S. Department of Agriculture, Economic Research Service.

Overview

- Background and research question
- Data wishlist and shortcomings of existing survey data
- Three types of federal data used in this project
  - Program (administrative) data from USDA NRCS Environmental Quality Incentives Program (EQIP)
  - Survey data from USDA Agricultural Resource Management Survey (ARMS)
  - Satellite data
- Challenges and innovations
- Preliminary results

Conservation Payments for No-Till Farming

- Farmer leaves crop residue on field at harvest, and plants next crop without tilling the soil
- USDA provides financial assistance for no-till through working lands programs such as the Environmental Quality Incentives Program (EQIP)
- > 90% of the acres that adopted no-till between 1996 and 2016 did so without a payment

Photo: Lynn Belts, USDA NRCS

Research Question: Legacy Effects

- Does practice continue after financial incentives end (persistence)?
- Knowing extent of persistence allows us to better estimate program benefits

Data Wishlist

- Treatment variable: Is farmer participating in the EQIP program, and for what years do they have a no-till contract?

- Information on other factors that affect farmer decision to adopt no-till, and farmer participation in conservation programs

- Outcome variable: Is farmer using no-till?

Data Wish List Reality Check

- Treatment variable: Is farmer participating in the EQIP program, and for what years do they have a no-till contract?

Administrative data from USDA Natural Resources Conservation Service

- Information on other factors that affect farmer decision to adopt no-till, and farmer participation in conservation programs

Biophysical data (public, USGS)
Crop type (public, cropland data layer from USDA NASS)

- Outcome variable: Is farmer using no-till?

Survey data not adequate.

Limitations of Existing Survey Data on No-Till Adoption

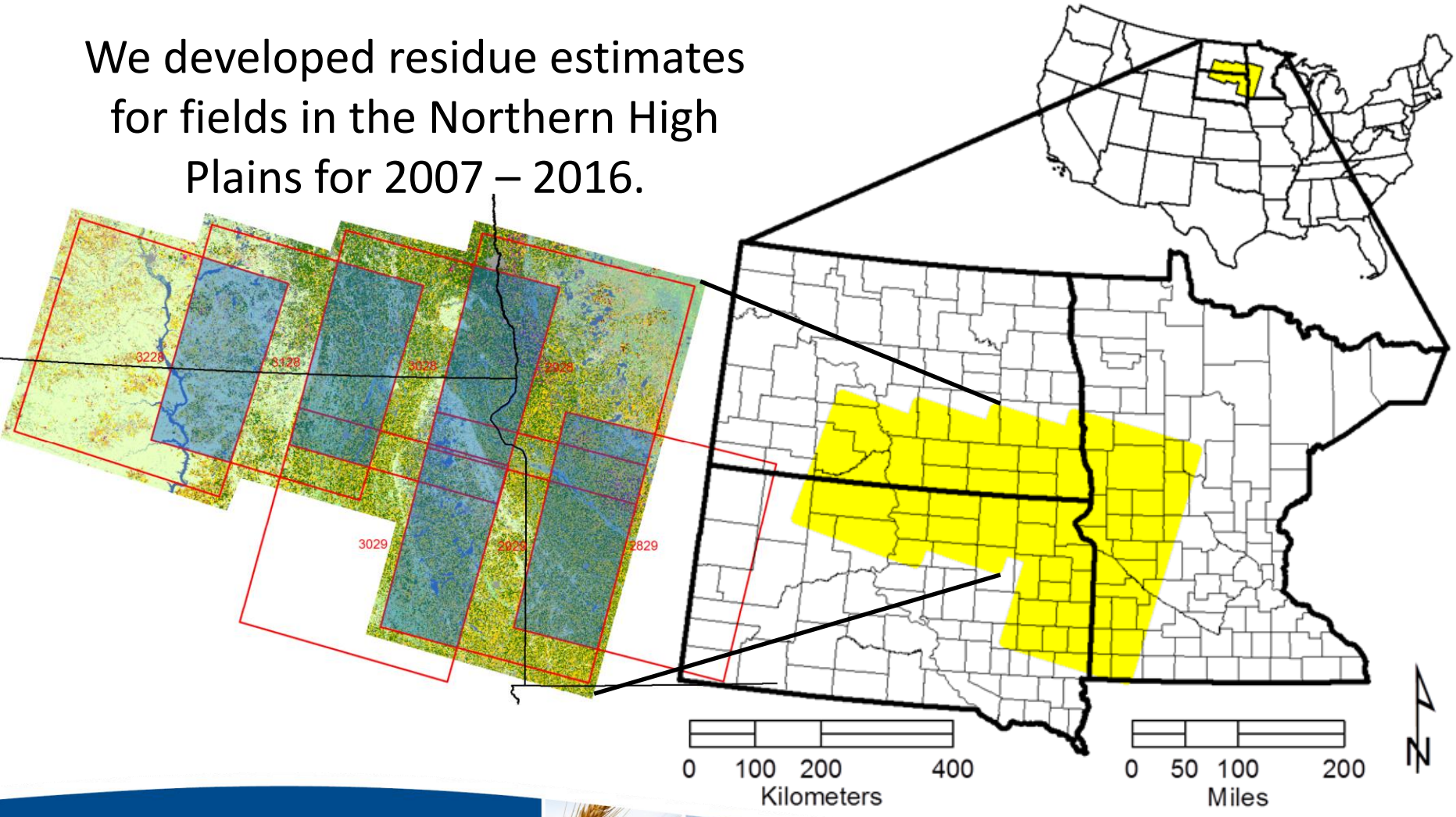
- **Time series length**: Up-to five years of no-till adoption data is not sufficient time when conservation contracts are typically three years
- **Treatment variable**: Linking surveys to data on prior program participation is difficult
- **Sample size**: There is low statistical power given the likelihood of program participation

Constructing a Proxy for No-Till Adoption using Satellite Imagery

- Goal: apply existing methods developed by USDA-ARS that transform remotely-sensed, multi-spectral imagery into an index of crop residue cover at planting time
- Challenge: previous work relied on calibration and validation using field observations
- Innovation: Validation with survey data
- Complicating factors:
  - Data sharing and confidentiality issues with non-USDA collaborator
  - Reliability of geolocation of survey data?
  - What spatial unit of analysis?

Constructing a Proxy for No-Till Adoption using Satellite Imagery, cont.

We developed residue estimates for fields in the Northern High Plains for 2007 – 2016.



Preliminary Results

- Survey data suggest that the farmer's decision to adopt no-till exhibits persistence in general

- Payments are associated with persistent (but modest) increases in residue following the payment

Summary

- Programs that pay for conservation practices may generate indirect impacts with measurable benefits
- New research questions may require a creative approach to developing and combining multiple data sources
- Satellite data, survey data, and administrative data have very different strengths and limitations, and combining them, in this case, leverages strengths of each

Questions?

maria.bowman@ers.usda.gov | (202)-694-5542