United States Department of Agriculture

No-Till/Strip-Till and Cover Crop Adoption: New data from ARMS

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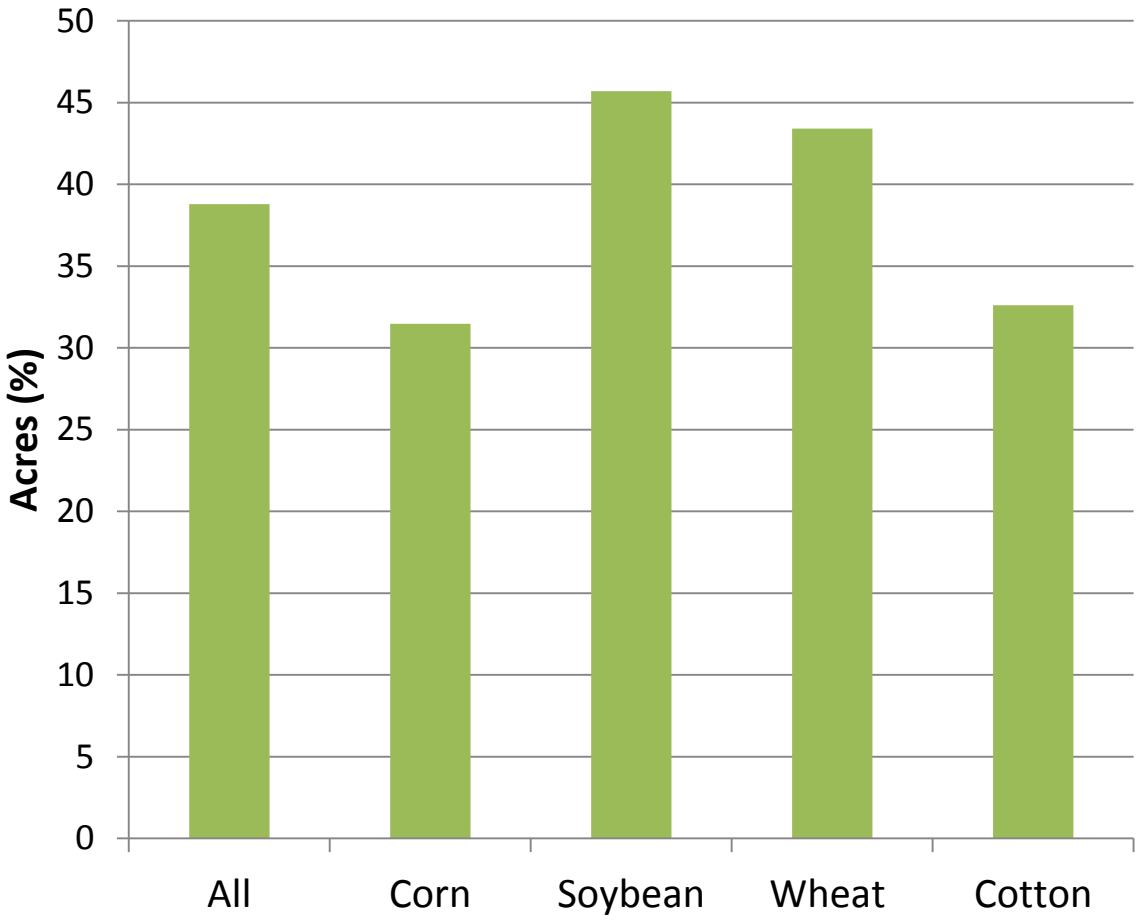
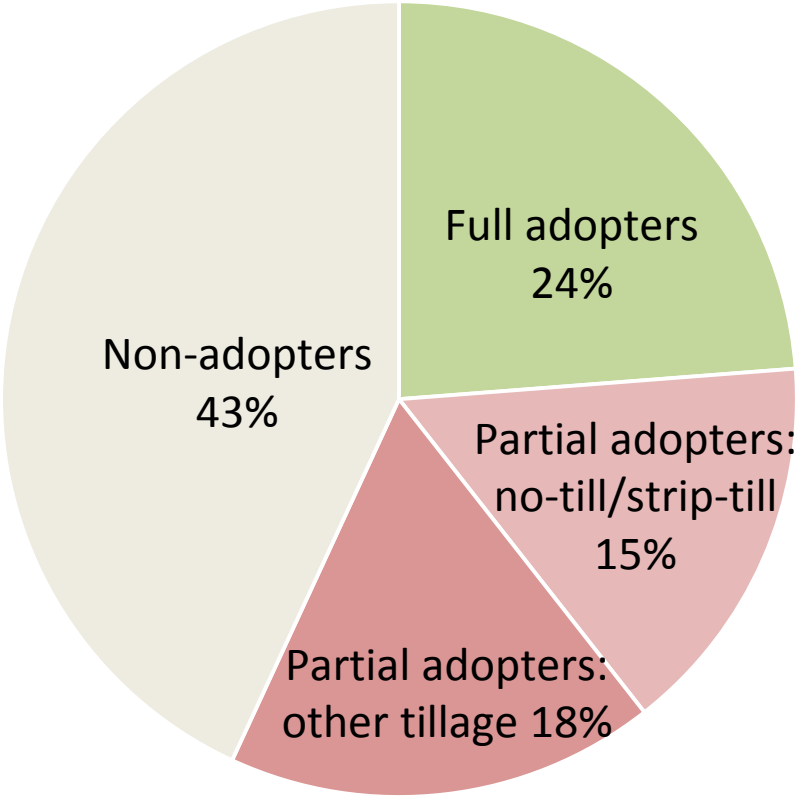
Agricultural Resource Management Survey (ARMS)—Farm Level (Phase III)

- Whole farm, cross-sectional survey
- Special section on no-till/strip-till and cover crops in 2010 and 2011 surveys
- No-till acreage for 4 crops: Corn, soybeans, wheat, and cotton
- Cover crop acreage

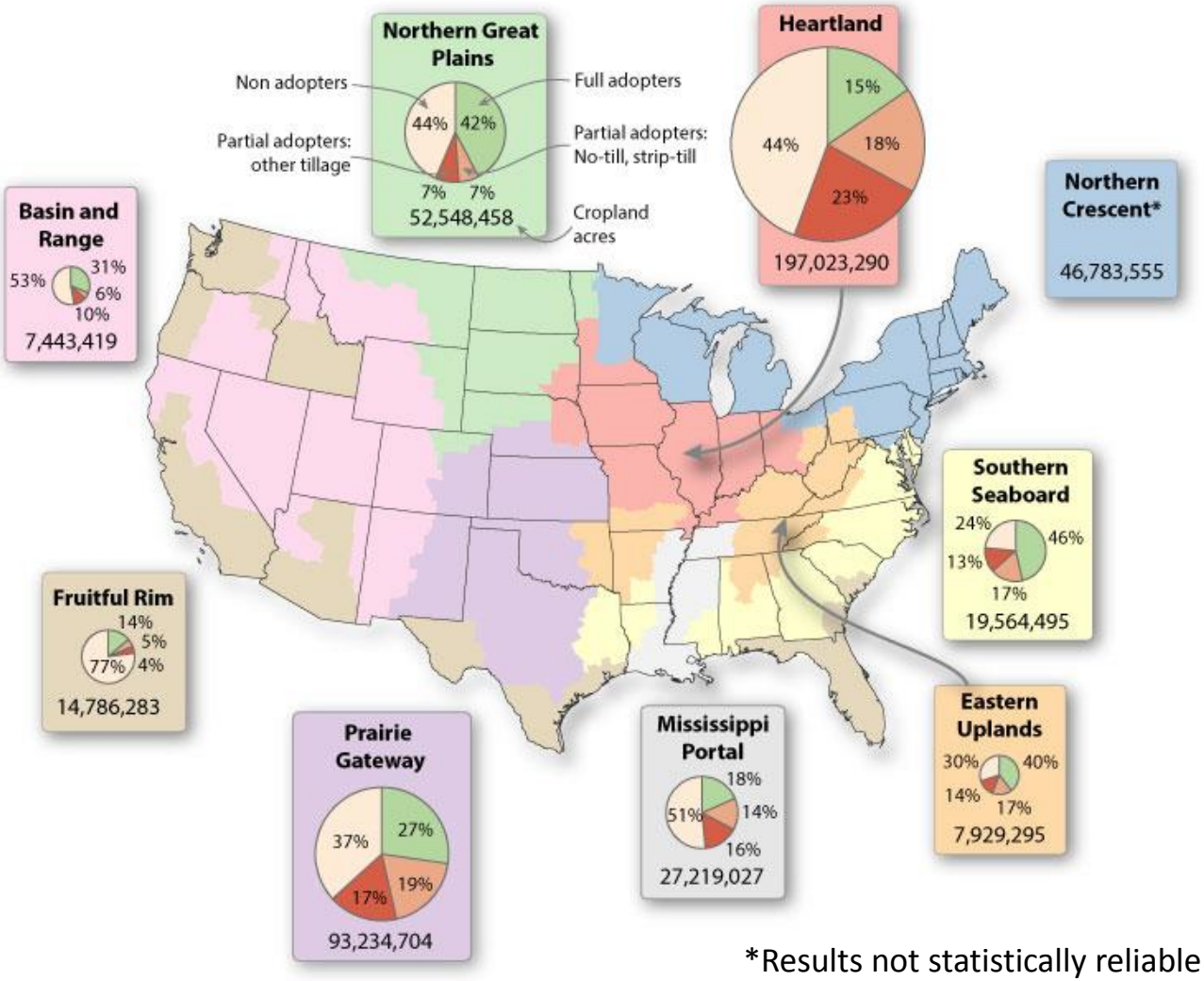
No-till/strip-till adoption by crop, 2010-11



Full and partial no-till/strip-till adoption on major crops, 2010-11

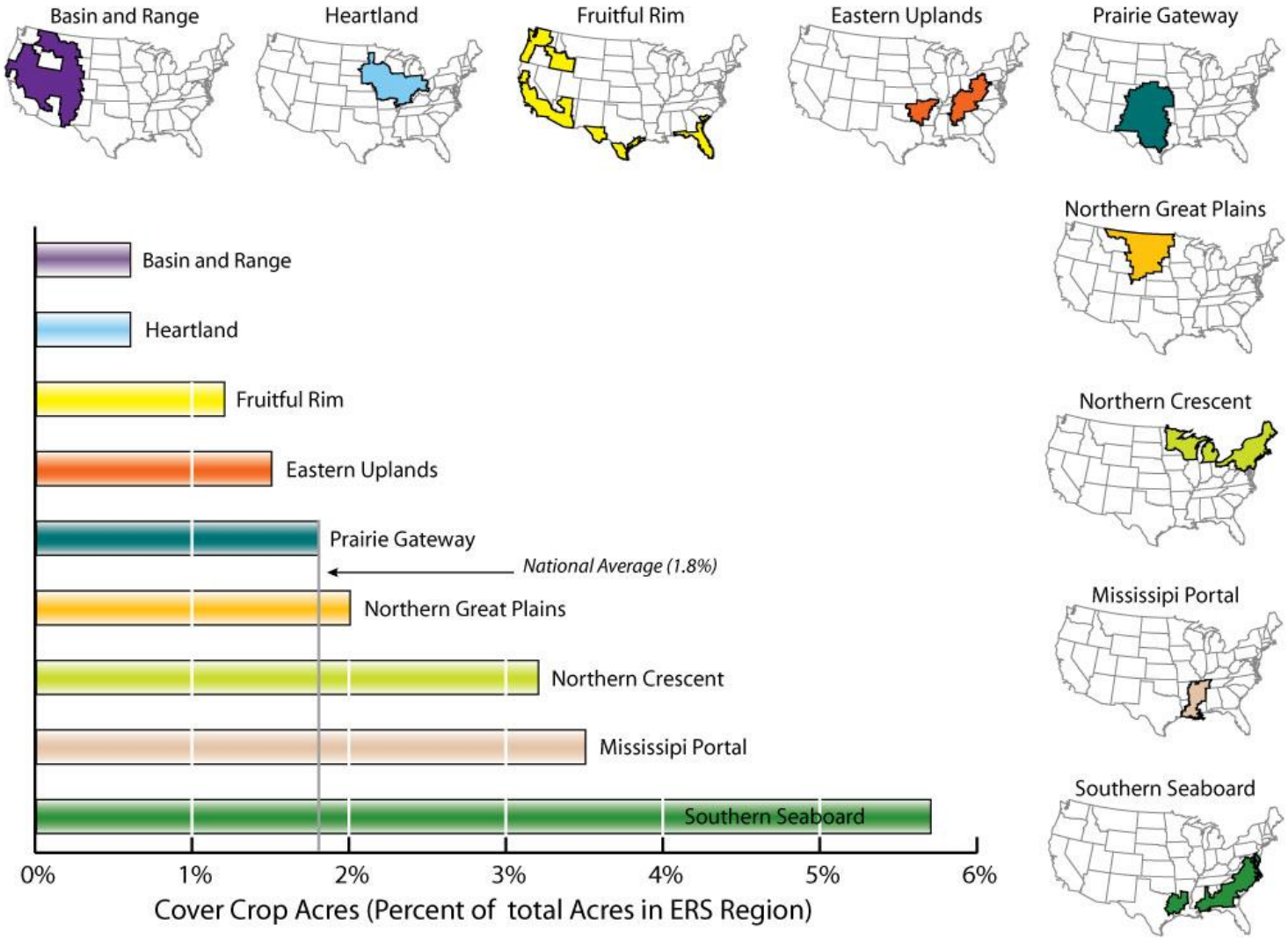


Full and partial no-till/strip-till adoption on major crops, by region, 2010-11



*Results not statistically reliable

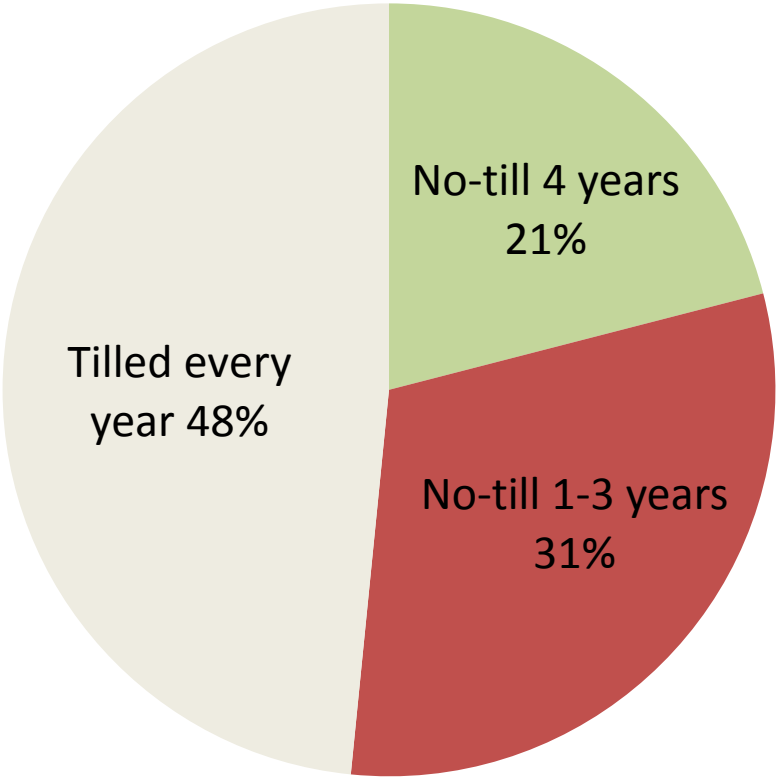
Cover crop adoption by region



Agricultural Resource Management Survey (ARMS)—Phase II

- Year-crop specific, cross-sectional survey
  - 2009 Wheat
  - 2010 Corn
  - 2012 Soybeans
- For each survey year, 4 years of no-till data
  - *Continuous Tillage: 4 years of tillage (i.e. 0 years of no-till)*
  - *Alternating No-Till: tilled at least once in 4 years (i.e. 1-3 years of no-till)*
  - *Continuous No-Till: 4 years of no-till*

No-till use over 4-year period for corn, soybean, and wheat fields, 2009-2012*



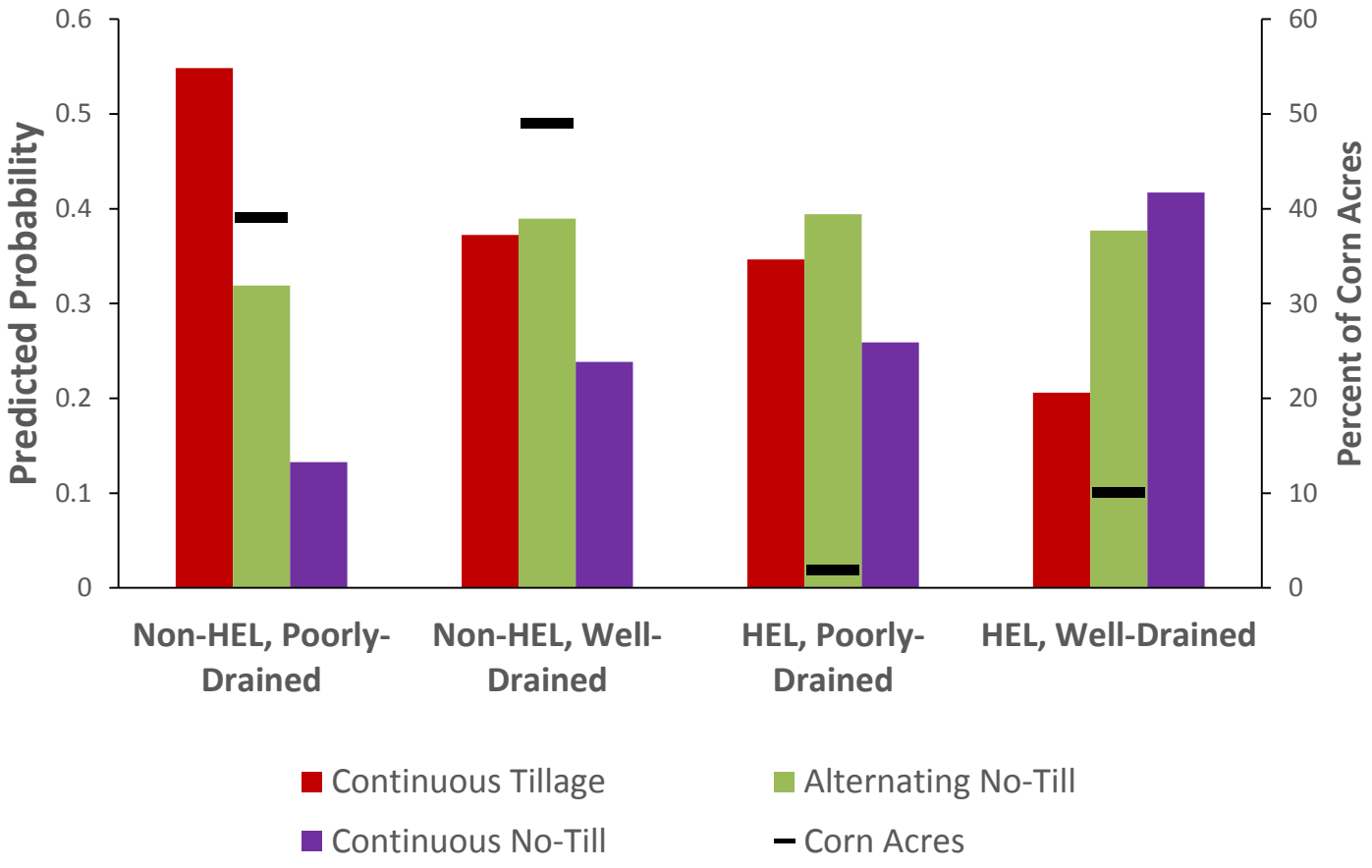
*Surveyed fields were in corn (2010), soybeans (2012), or wheat (2009) in the survey year but could have been planted to other crops in three years prior to the survey year.

Ordered Logit Model of No-Till Adoption

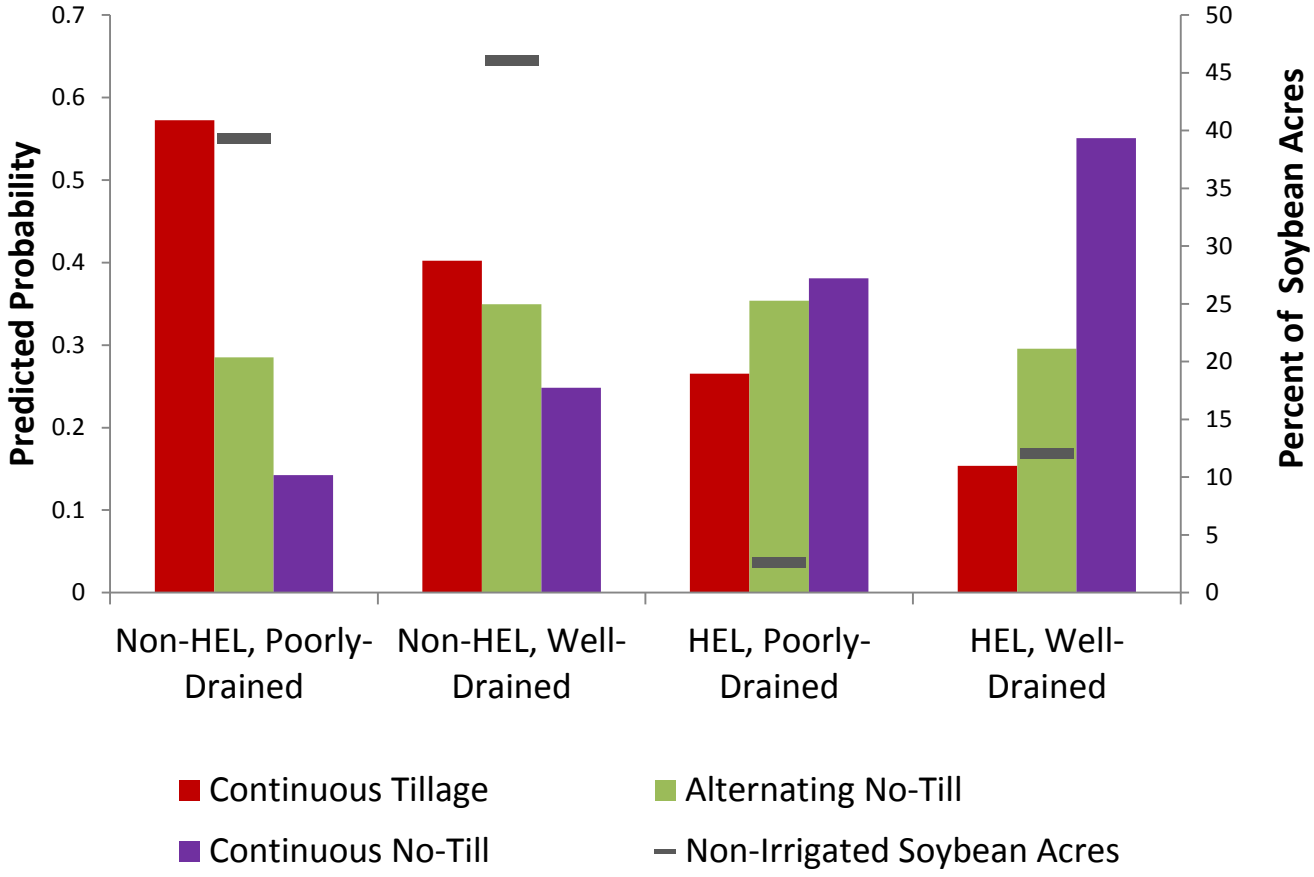
- Separate models for Corn and Soybean surveys
- Dependent variable based on tillage in survey and previous years:
  - Continuous tillage (1)
  - Alternating no-till (2)
  - Continuous no-till (3)
- Independent variables:
  - Field: *soil productivity, HEL status, drainage, irrigation*
  - Farm: *farm size (crop acreage), ERS typology, tenure*
  - Climate: *temperature, rainfall (average and variability)*
  - Demographic: *age, education*

Independent Variables (Selected)	Significant in:	
	Corn Sample Model	Soybean Sample Model
Productivity Index (NCCPI, 0-100)	-	
HEL (0-1)	+	+
Well-Drained Soil (0-1)	+	+
Irrigated Field		
Cropland Acreage (log)	+	+
Average Temperature (°C)	+	+
Average Temp Squared	-	-
Temperature Variability (°C)	-	-
Average Precipitation (mm/mo.)		-
Average Precip. Squared		
Precipitation Variability (mm/mo.)		

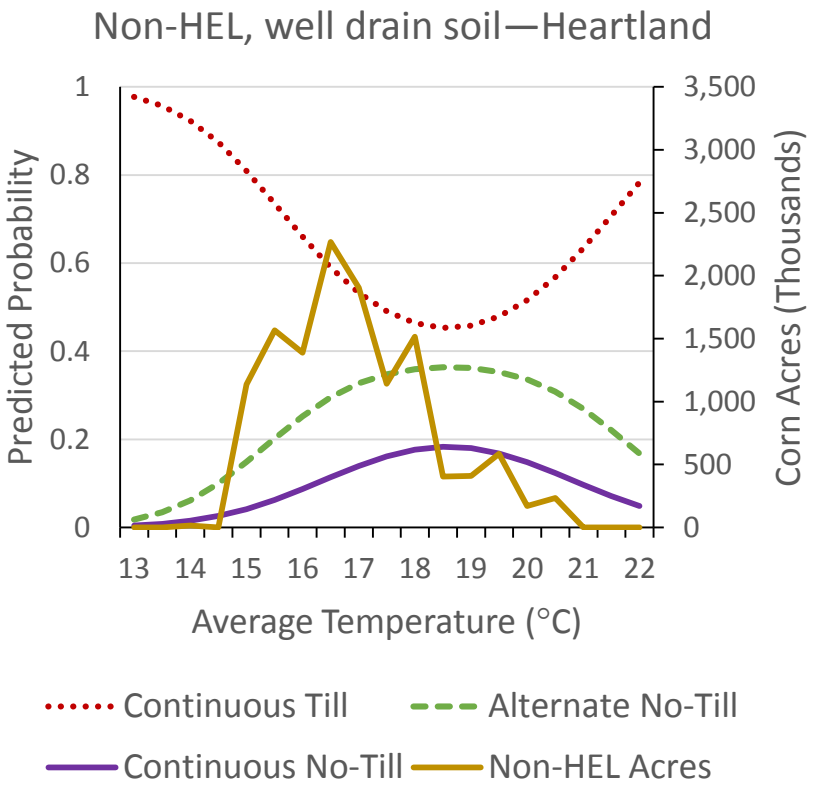
Predicted Probabilities—Corn Survey HEL and Drainage

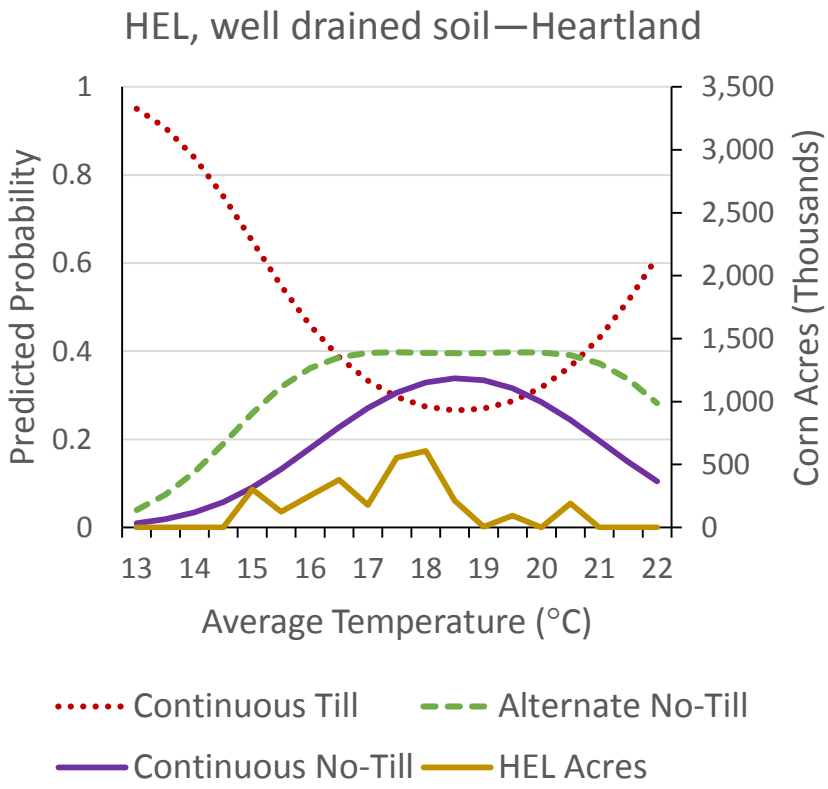


Predicted Probabilities—Soybean Survey HEL and Drainage



Predicted Probabilities—Corn Survey Average Temperature





Conclusion

- Partial/Alternating adoption of no-till is common
  - Roughly half of cropland on farms that use no-till/strip to some extent
  - Less than half of that cropland is on farms where no-till/strip is fully adopted
- Soil and climate factors appear to be important determinants
  - HEL designation, Soil Drainage, Climate,
  - Farm size also important
- Policy questions to consider
  - What level/type of incentive is needed to encourage continuous adoption?
  - Does it differ from the incentive needed to encourage first-time adoption?