Trends and Determinants of Farmland Values: NYS and Beyond

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Dyson
Cornell
SC Johnson College of Business

A Quick Introduction: Dr. Wendong Zhang

- Grew up in a rural county in Shandong Province, China
- Attended college in Shanghai and Hong Kong
- Ph.D. in Ag Econ from Ohio State in 2015
- Worked at Iowa State for 7 years, leading the Iowa Land Value Survey
- Moved to Cornell University Dyson School of Applied Economics & Management in July 2022 (50% research 50% extension appointment)
- Research and extension interests:

  Led land value/ownership surveys https://www.card.iastate.edu/farmland

  Co-founded ISU China Ag Center https://www.card.iastate.edu/china

  Cornell Atkinson Center for Sustainability: https://atkinson.cornell.edu/

  Cornell Institute for China Economic Research (CICER) http://china.dyson.cornell.edu/

  Global Public Voices Fellow, Einaudi Center for International Studies

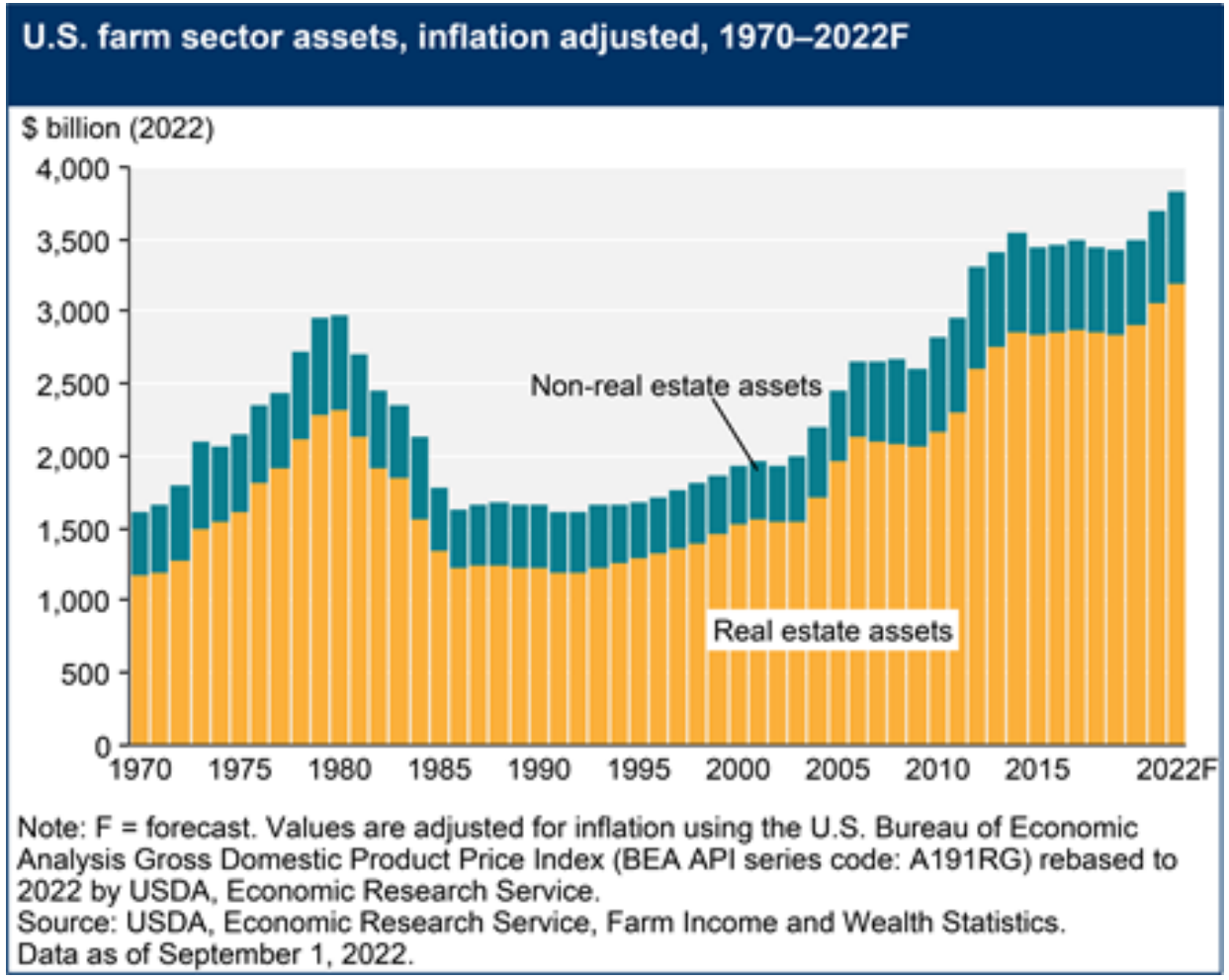
  Member of ASFMRA (American Society of Farm Managers & Rural Appraisers) Northeast Chapter

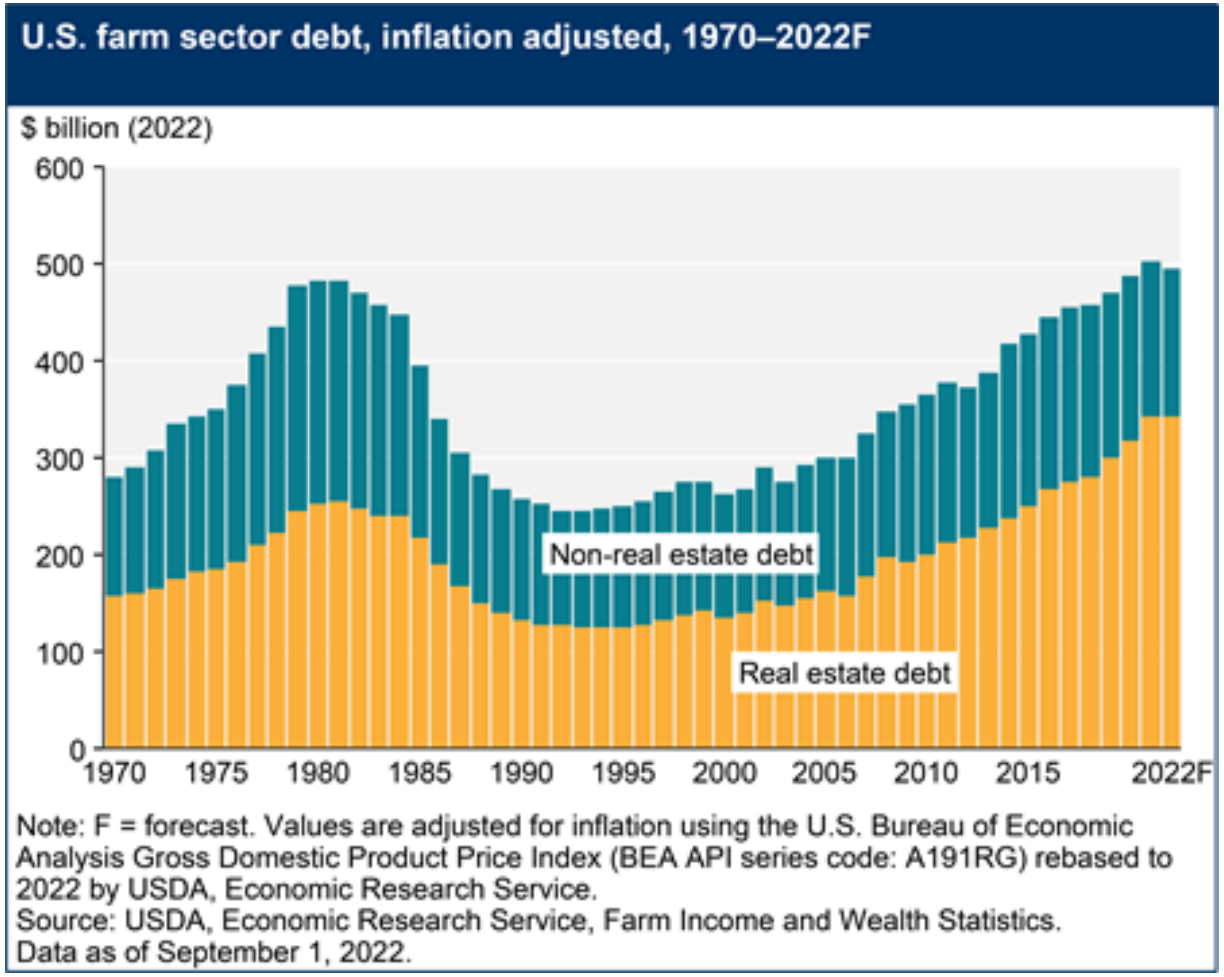
Agenda for today

- General farmland market trends
- New York State farmland market trends
- Farmland ownership trends
- Investor and foreign ownership of US and NYS land
- Energy & farmland values

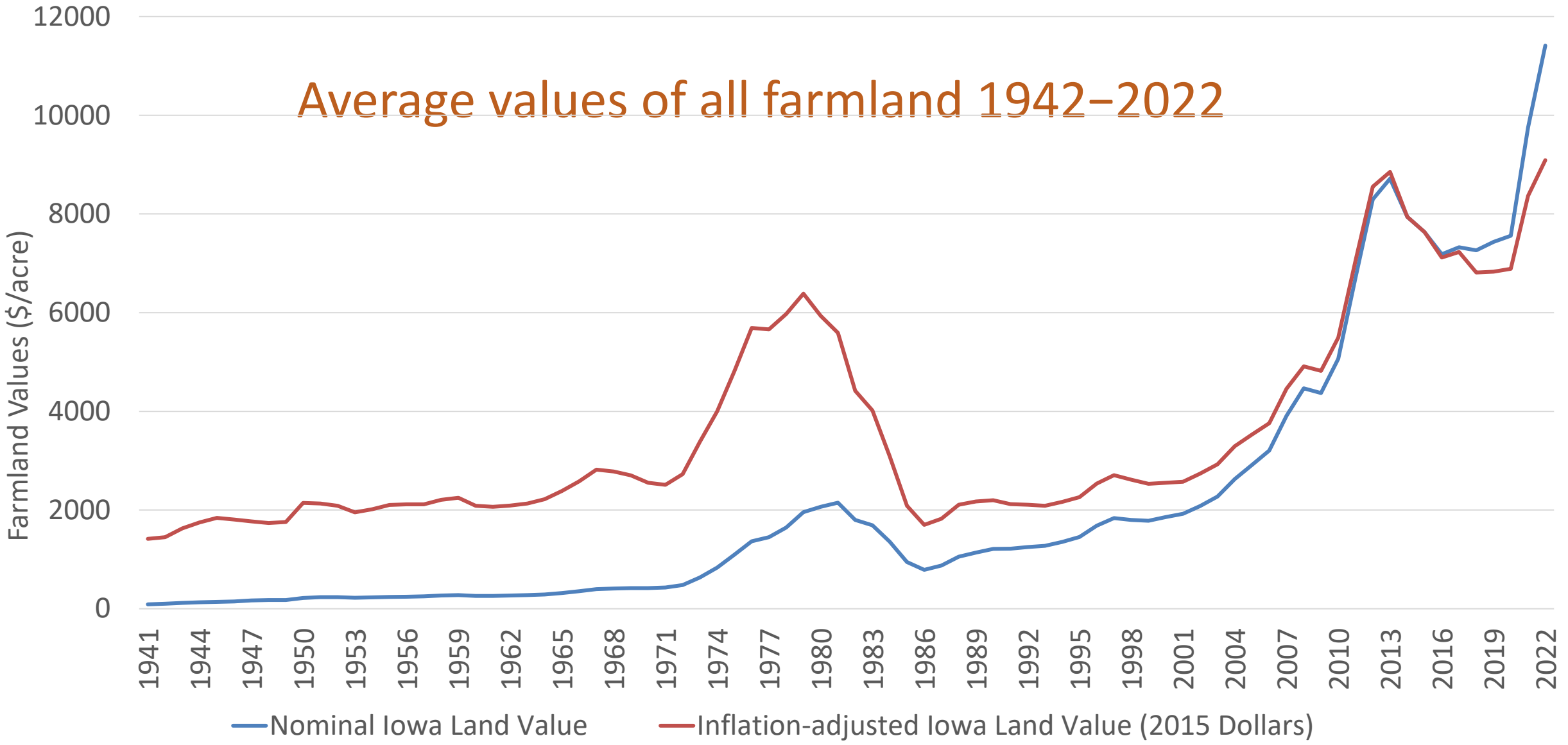
General Farmland Market Trends - Lessons from the Midwest

Why We Care About Farmland?





Nominal and inflation-adjusted land values all reach historic highs (Nominal values +17%; Inflation-adjusted values +8.6%)



Cash Rents Tend to Follow Land Values

2019-2023 Overall Average of Typical Cash Rents for Corn and Soybean Acres by Iowa Crop Reporting District (dollars per tillable acre).

	2019	2020	2021	2022	2023
District 1	$231	$239	$242	$270	$302
District 2	219	225	238	261	285
District 3	237	248	253	278	307
District 4	235	237	247	276	298
District 5	231	232	245	271	292
District 6	229	232	243	265	283
District 7	207	203	214	243	265
District 8	174	176	188	203	227
District 9	210	205	221	240	252
State	**$219**	**$222**	**$232**	**$256**	**$279**

Table 1. Average and Professionally Managed Cash Rents, Illinois, 2021, 2022, and 2023P

Land Class	Soil Productivity Index	Average Corn Yield[1] Bushels/Acre	Average Rent[2] $/Acre		ISPFMRA Rents $/Acre		
			2021	2022	2021	2022	2023P
Excellent	133 to 147	211	$277	$314	$309	$369	$386
Good	117 to 132	204	$240	$263	$265	$322	$336
Average	100 to 116	190	$185	$215	$225	$275	$284
Fair	<100	142	$135	$171	$166	$240	$248

[1] Average corn yields from 2017 to 2021 for counties with average SPIs in the various ranges.

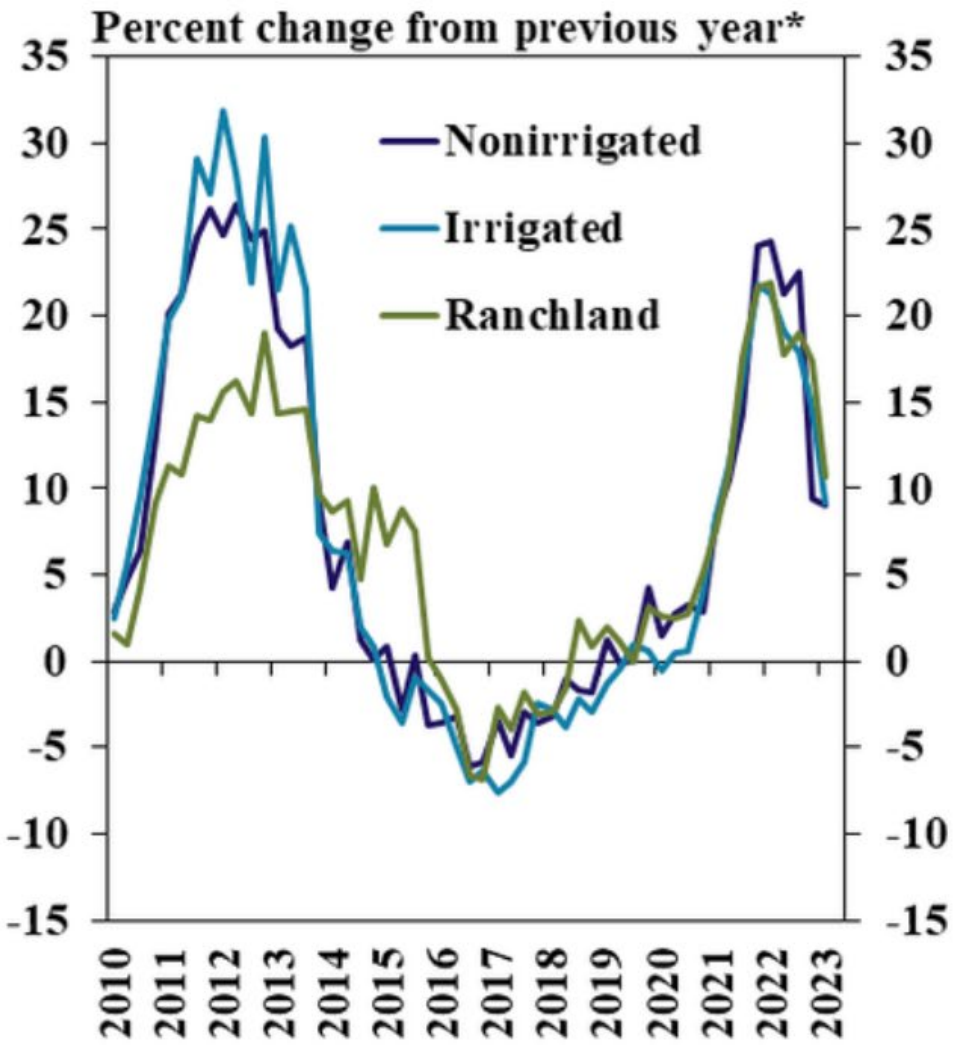
[2] Average of NASS cash rents for counties with average SPIs in the various ranges.

Data Sources:
National Agricultural Statistics Service, USDA, for corn yields and average rents
Illinois Society of Professional Farm Managers and Rural Appraisers (ISPFMRA) rents come from their land value effort available on the ISPFMRA.org website.

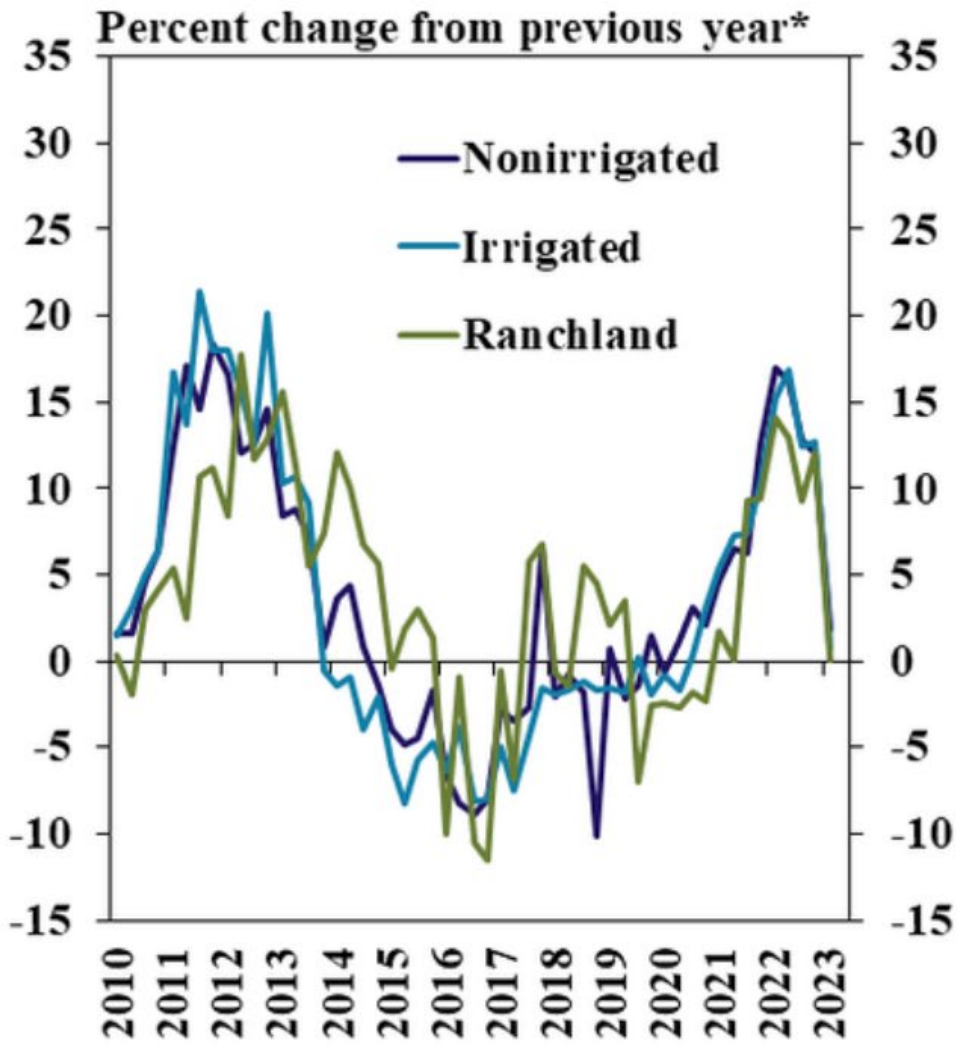
ILLINOIS farmdocDAILY

https://www.extension.iastate.edu/agdm/wholefarm/pdf/c2-10.pdf

Farmland Values



Cash Rents



FEDERAL RESERVE BANK of CHICAGO

Last Updated: 05/11/23

AgLetter

A quarterly newsletter on agricultural land values and credit conditions, based on data from the Bank's survey.

In the Latest Edition of *AgLetter*

Midwest Farmland Values Still Rose but More Slowly in the First Quarter

According to the most recent *AgLetter*, Seventh District farmland values in the first quarter of 2023 were 10 percent higher than a year ago. Values for "good" agricultural land in the first quarter of 2023 were 2 percent higher than in the fourth quarter of 2022.

Percent change in dollar value of "good" farmland

	January 1, 2023 to April 1, 2023	April 1, 2022 to April 1, 2023
Illinois	+2	+11
Indiana	+8	+22
Iowa	+1	+7
Michigan	*	*
Wisconsin	+2	+15
Seventh District	+2	+10

NCREIF Farmland Property Index

- **Permanent Cropland**

2Q2022	3Q2022	4Q2022	1Q2023	
0.53%	0.90%	0.68%	0.17%	2.30%

- **Annual Cropland**

2Q2022	3Q2022	4Q2022	1Q2023	
2.05%	2.67%	4.65%	3.30%	13.27%

Local Land Supply and Demand Explain Variations in Land Market

Land Value = localized net income / universal interest rate

Conceptual framework

- The capitalization formula

$$V_{it} = E_t \sum_s \frac{R_{is}}{(1+\delta_t)^{s-t}}, where\ s = t, t+1, \ldots$$

$$R_{it} = \beta' \boldsymbol{X}_{it} + \tau_t + \eta_{it}$$

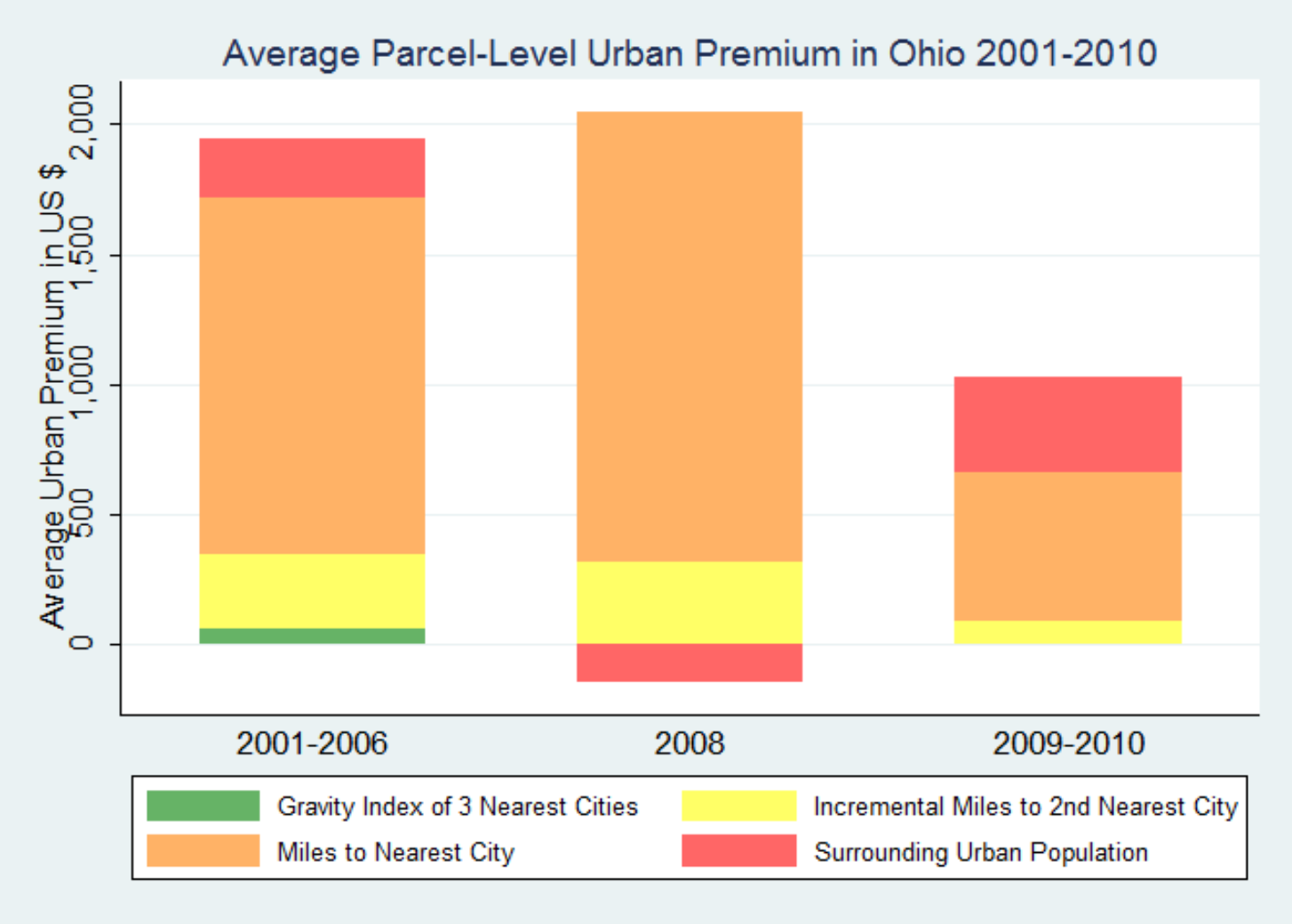
$$V_{it} = E_t \sum_s f(\boldsymbol{A}_{it}, \boldsymbol{N}_{it}, \boldsymbol{U}_{it}, \boldsymbol{M}_{it}; \delta_t)$$

- parcel-specific attributes affecting agricultural productivity **Ait** such as soil quality
- natural amenities variables **Nit** such as proximity to surface water
- unban influence variables **Uit** such as surrounding urban population, access to highway
- agricultural market influence variables **Mit** such as proximity to ethanol plants, grain elevators and agricultural output terminals

Interpreting The Results

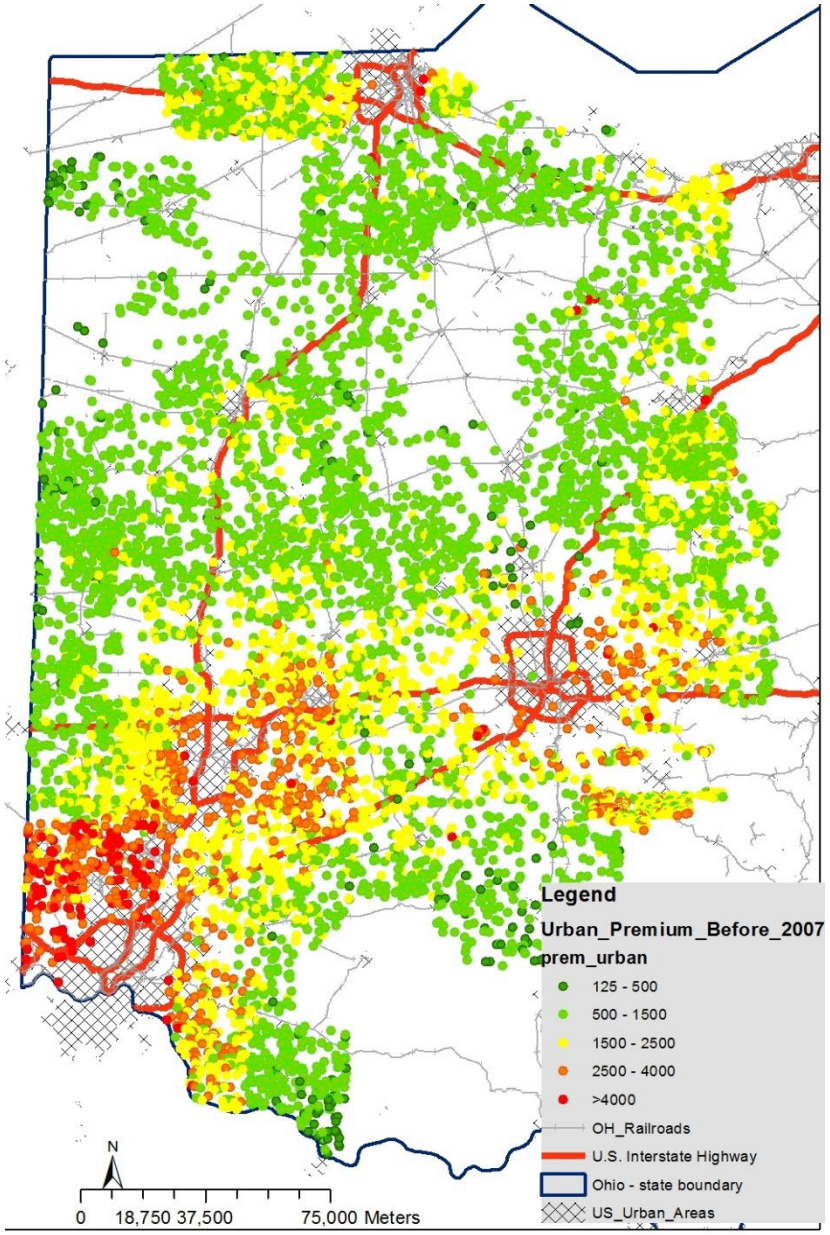
Major Urban Influence Variables	Marginal Effects	
	01-06	09-10
Distance to Nearest City Center	$28/mile***	$8/mile
Incremental Distance to 2nd Nearest City Center	$11/mile ***	$0/mile
Surrounding Urban Population in 25 miles	$0.68/thousand***	$1.51/thousand***
Gravity Index	$60/unit***	$0/unit

The Evolution of urban premium over time before and after 2007-08 residential housing market bust

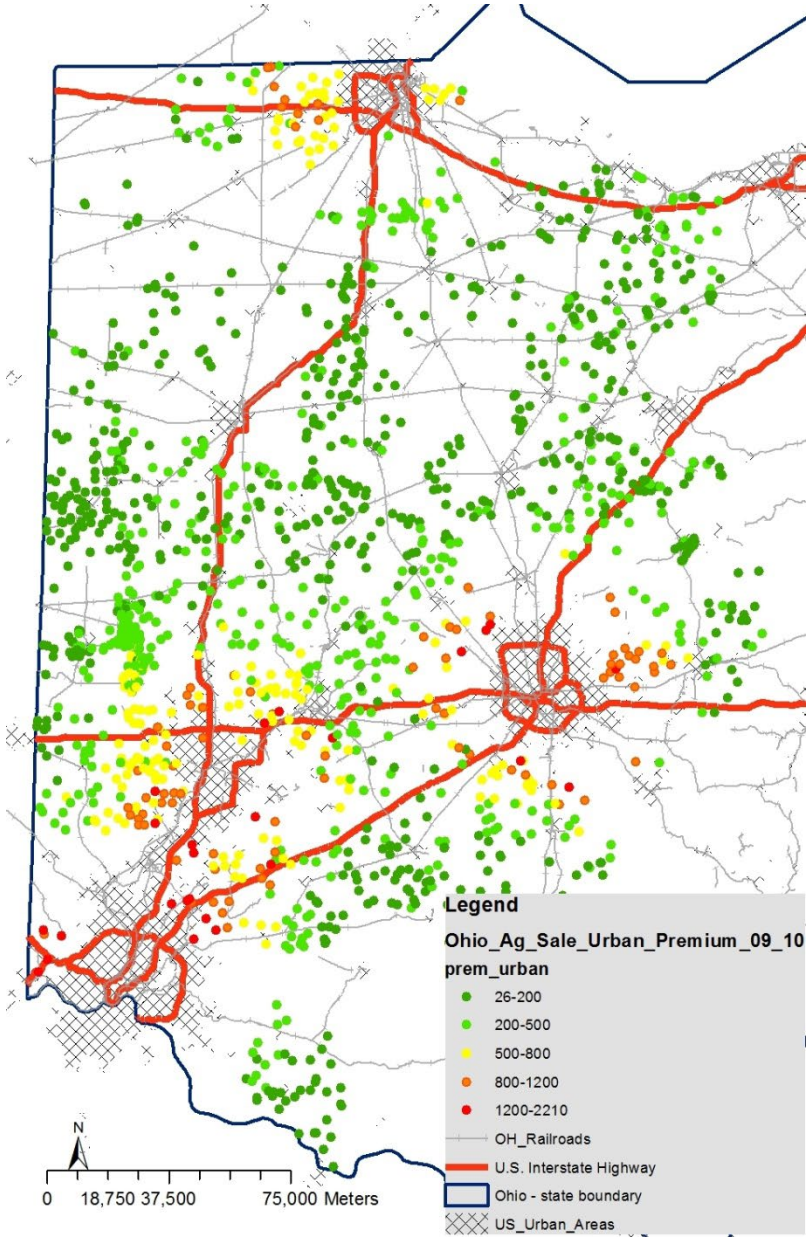


All coefficients are included, regardless of significance

The spatial distribution of urban premium

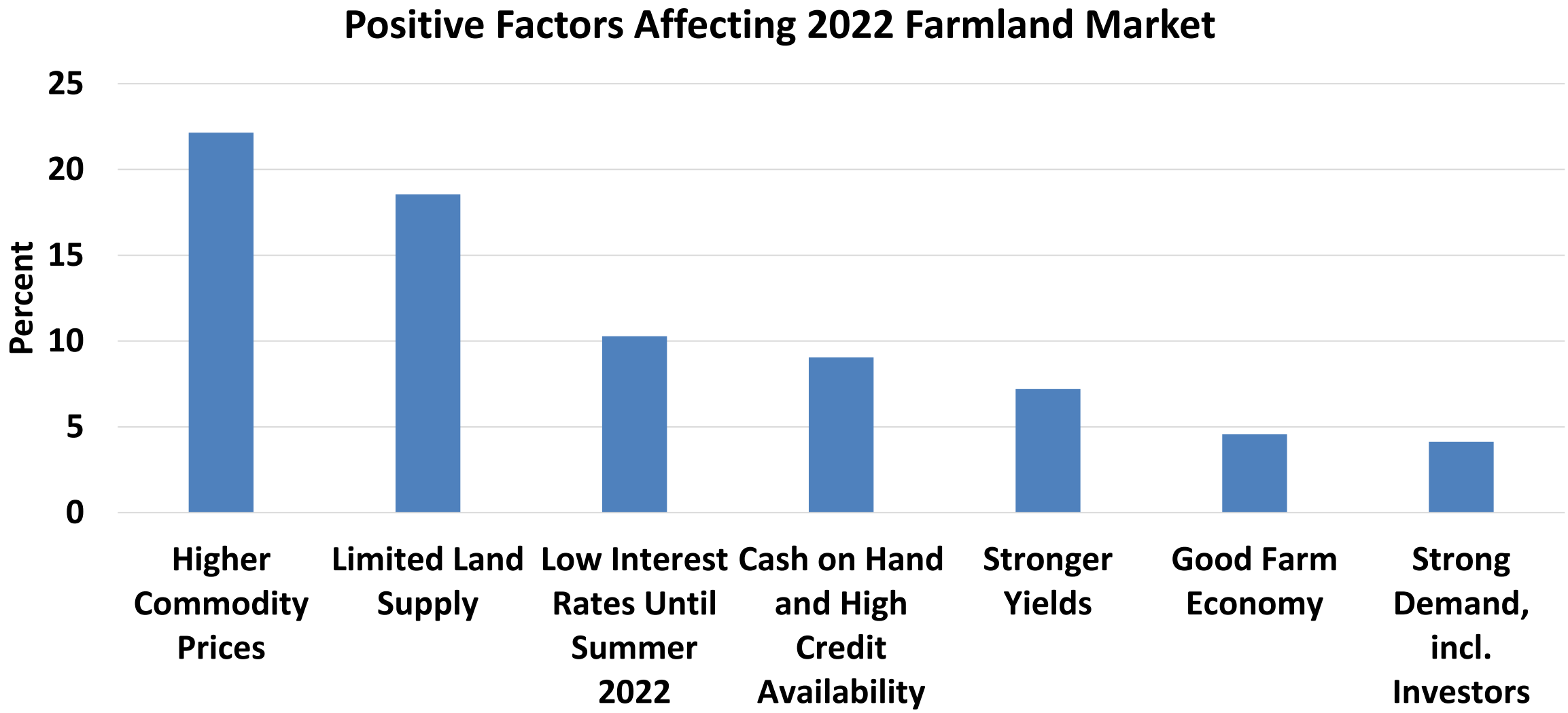


2001 - 2006



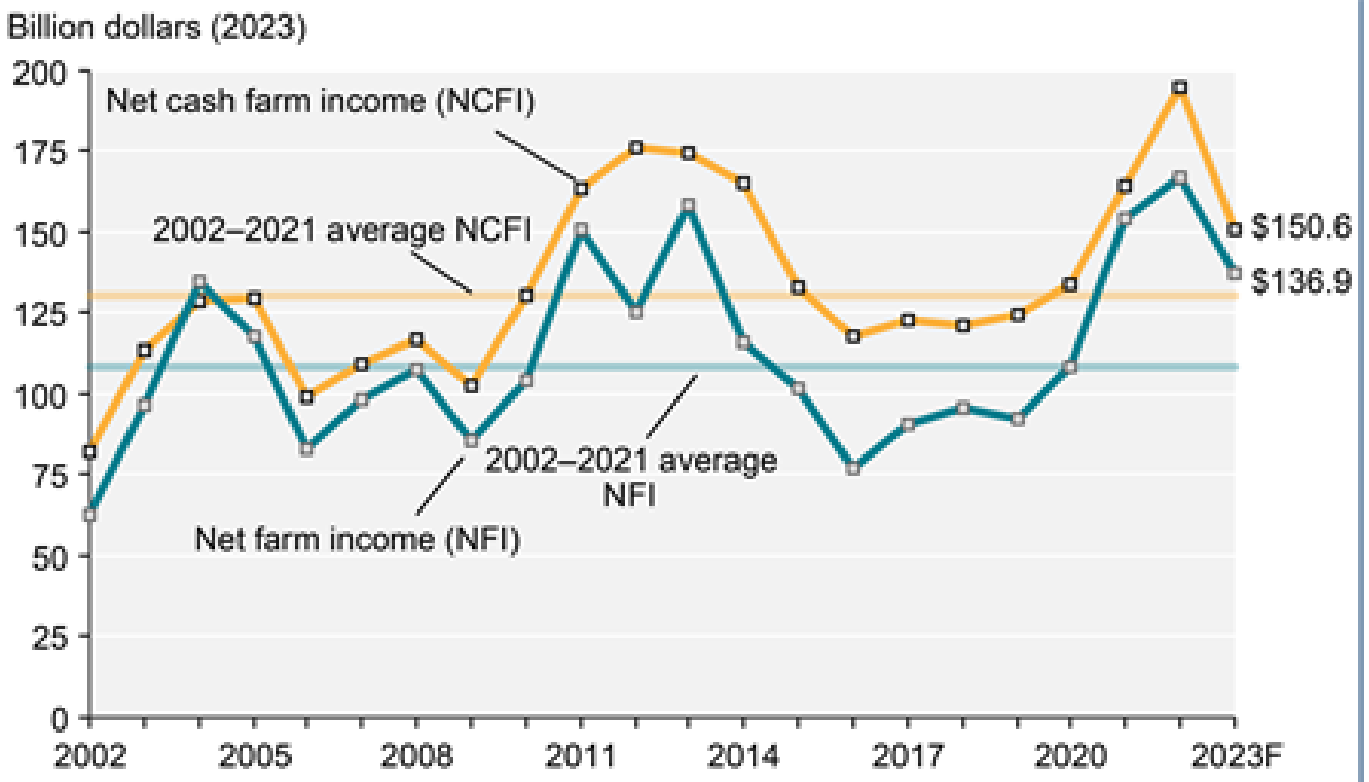
2009-2010

Major Positive Factors Affecting Iowa Farmland Market, 2022



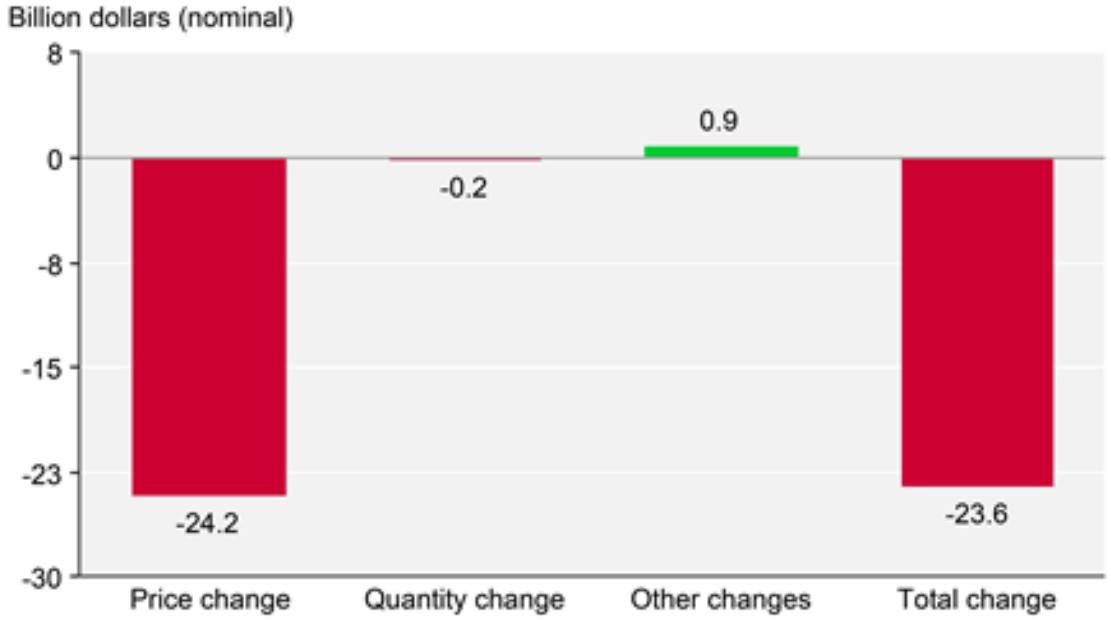
2023 Farm Income is Stronger, But is Smaller

U.S. net farm income and net cash farm income, inflation adjusted, 2002–2023F



Note: F = forecast. Data for 2022 and 2023 are forecasts. Values are adjusted for inflation using the U.S. Bureau of Economic Analysis Gross Domestic Product Price Index (BEA API series code: A191RG) rebased to 2023 by USDA, Economic Research Service.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of February 7, 2023.

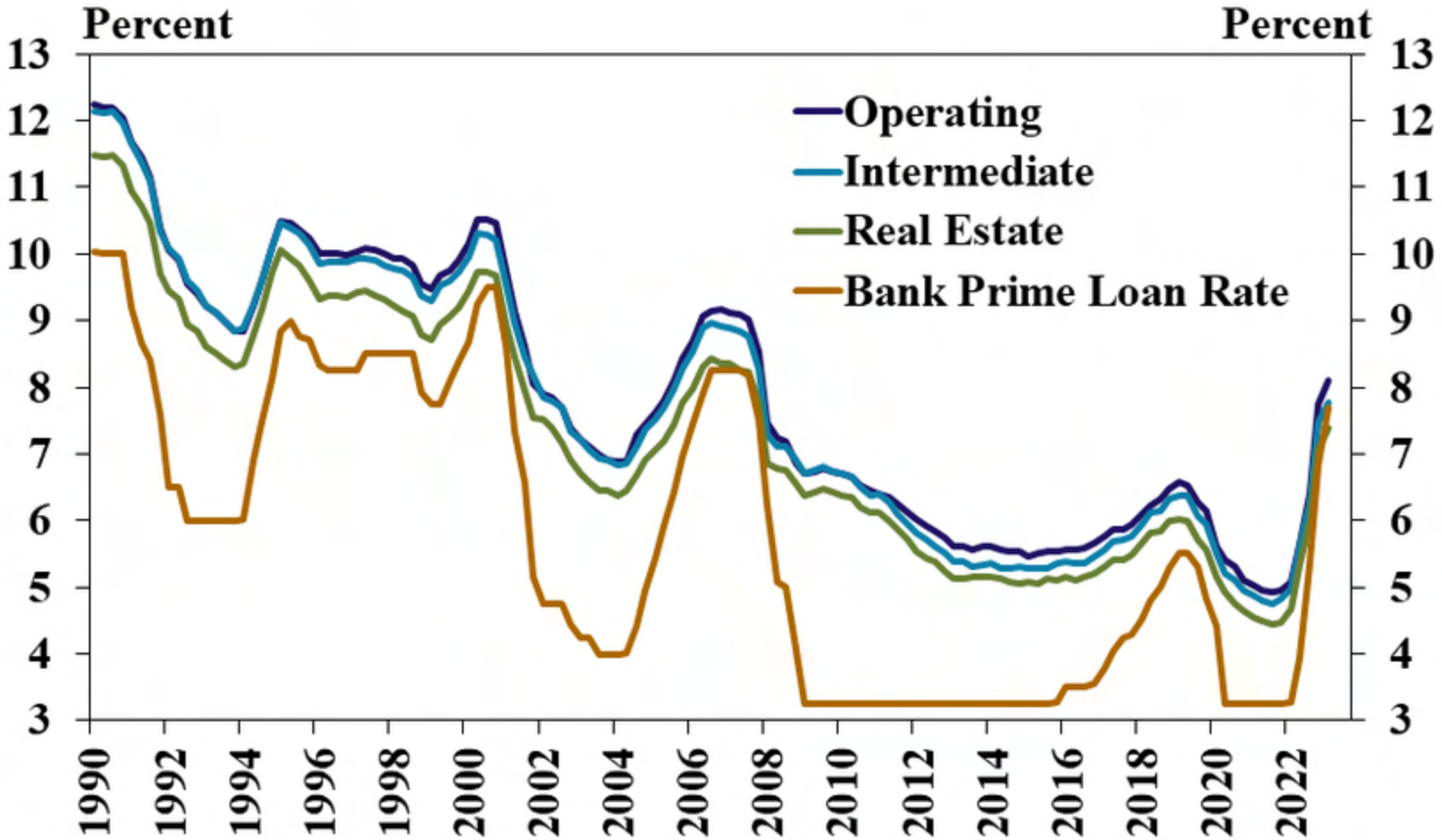
Change in U.S. farm cash receipts, 2022F–2023F, by component of change



Note: F = forecast. Other changes include price/quantity changes in "all other crops" (excluding sugarcane and sugarbeets), proso millet, and miscellaneous animals/products for which data are not available. Price, quantity, and other changes may not sum to total because of rounding.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of February 7, 2023.

https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/farm-sector-income-forecast/

Chart 1: Tenth District Average Interest Rates

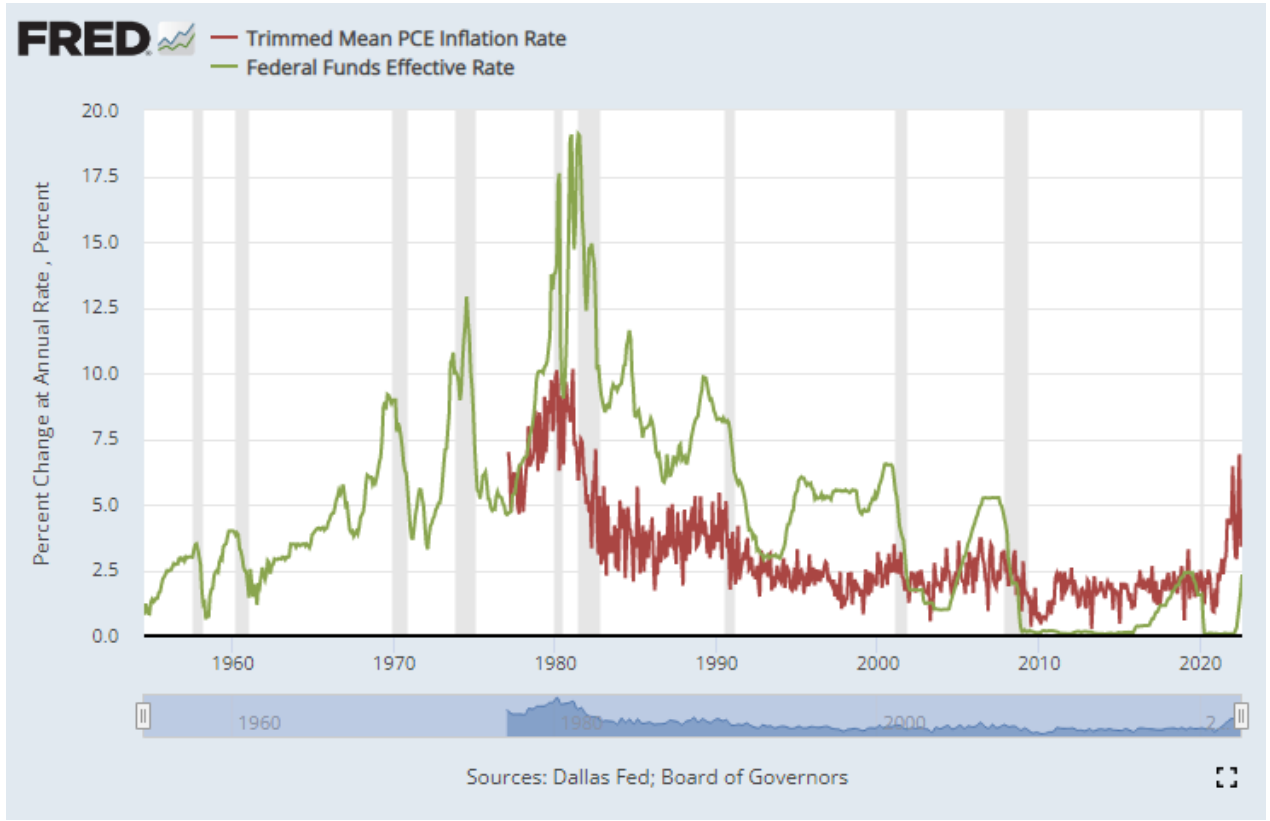


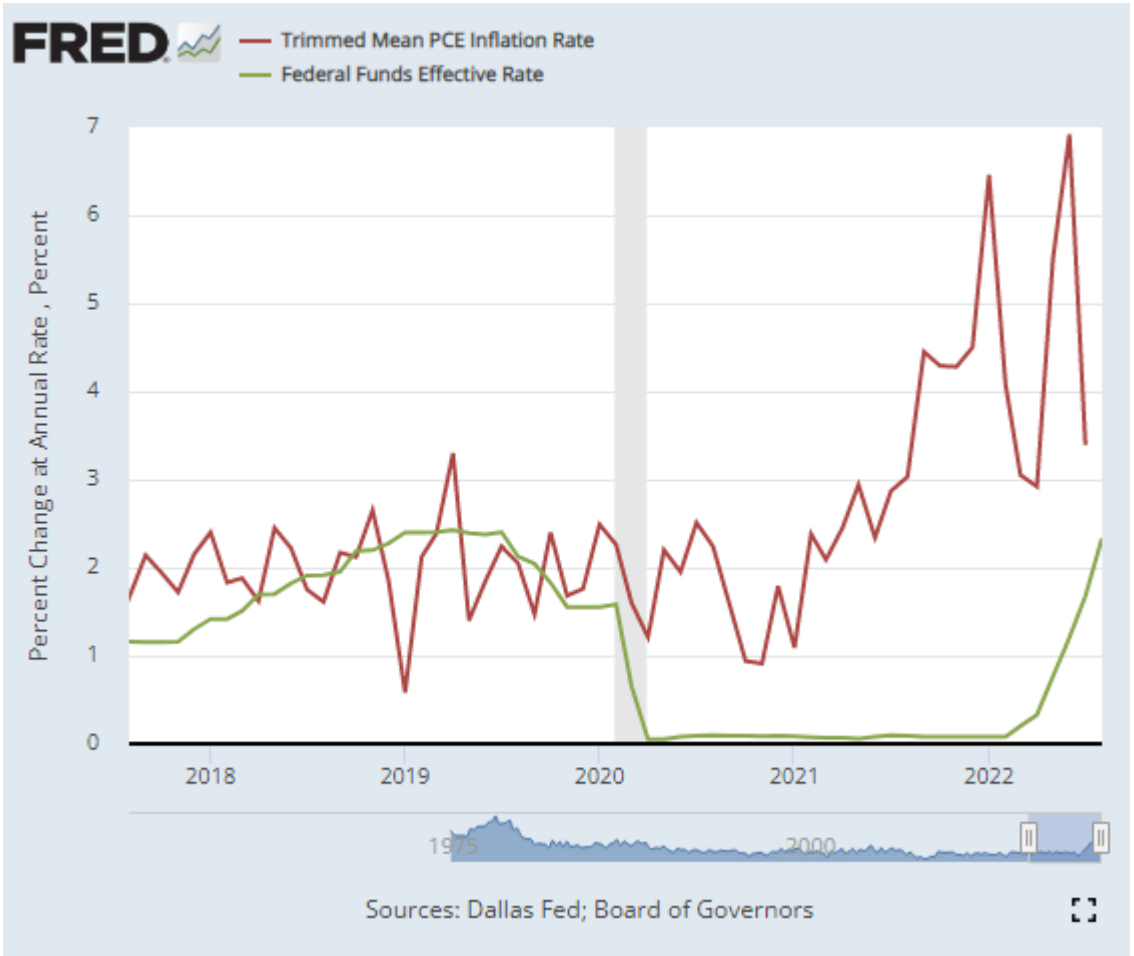
Note: Average rates are calculated as the average of fixed and variable rates for each loan category.
Sources: Federal Reserve Board and Haver Analytics

Interest Rates are Much Higher

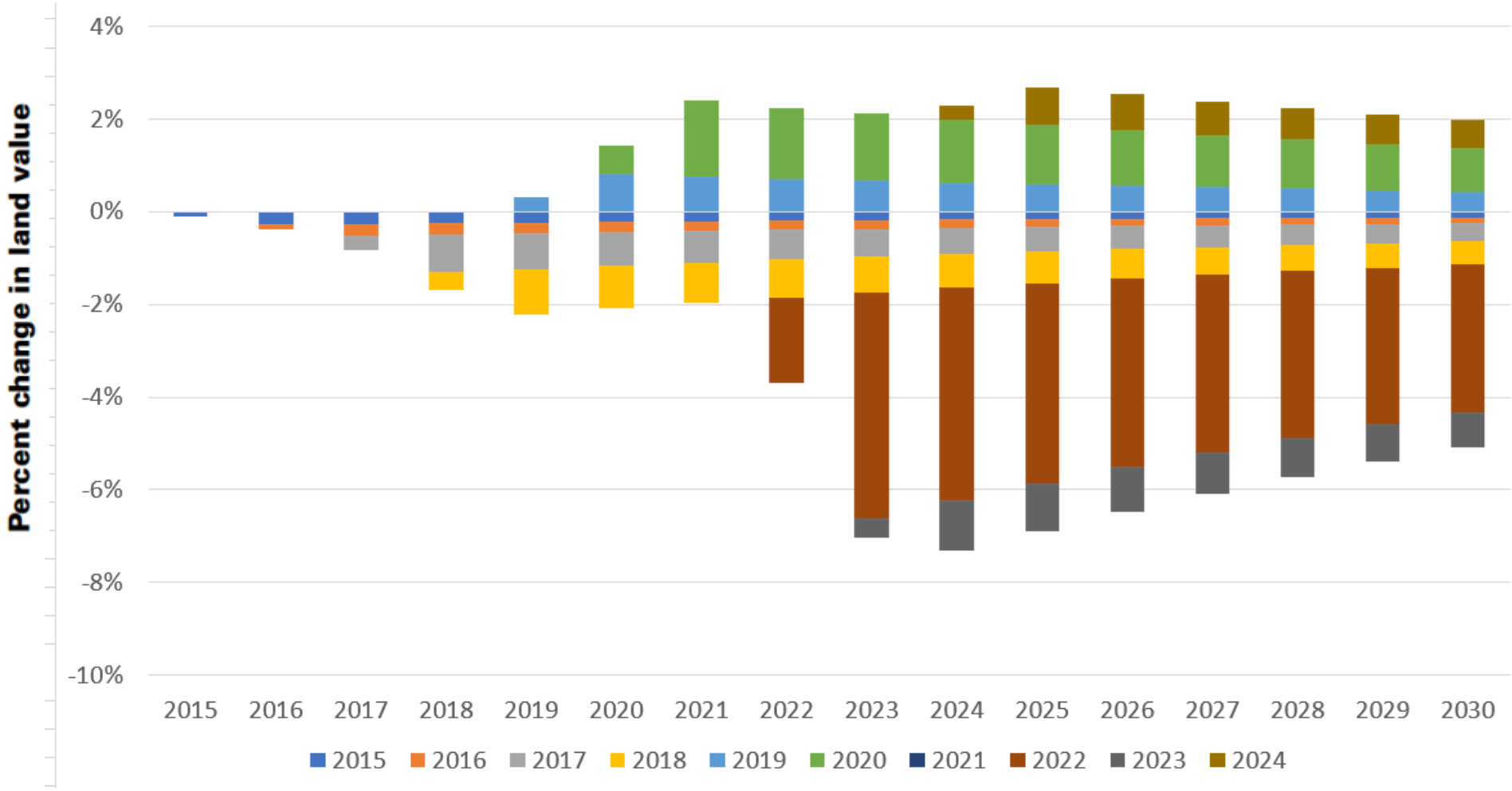
Federal Reserve raises interest rates amid stubbornly high prices and recession concerns

Jul 27, 2022 6:55 PM EDT

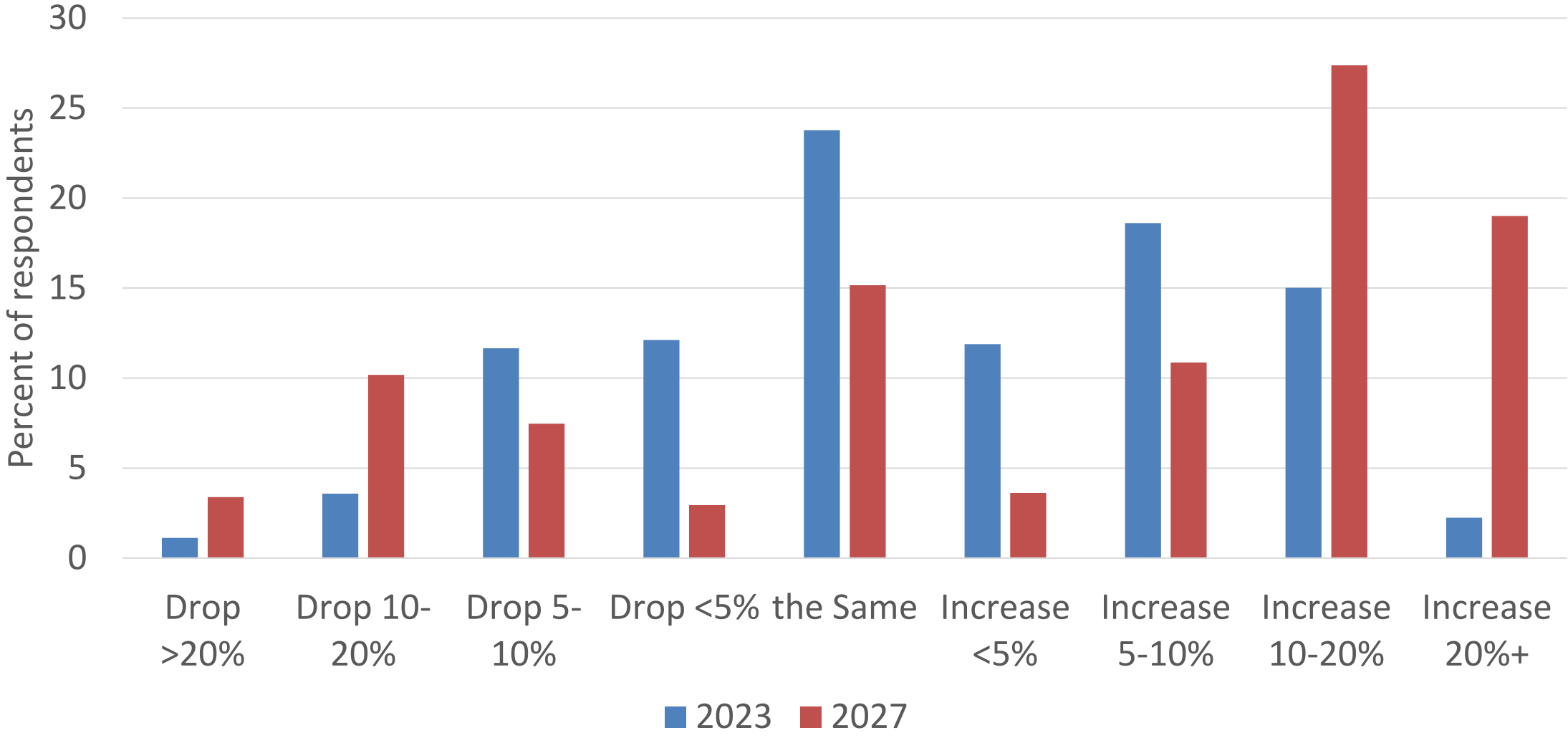




The short- & long-term impacts of recent and projected federal interest rate changes on New England states' farmland values



Land value predictions for 2023 and 2027 as of Nov 2022



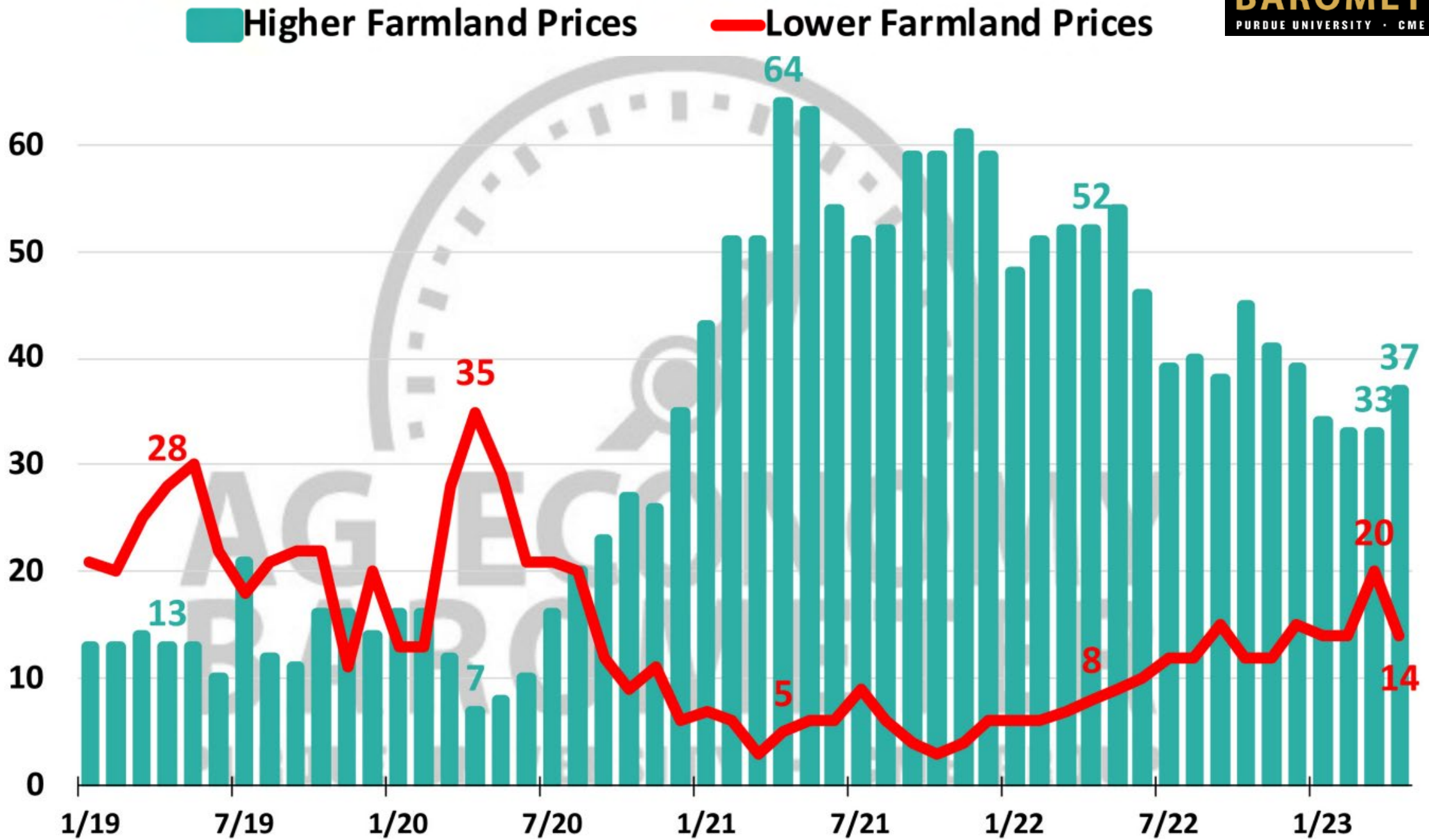
From 2022 Iowa State University Land Value Survey
www.card.iastate.edu/farmland

Iowa Ag Professionals' Expected Land Value Changes in % Relative to May 2023 at SMLV

	Iowa	NW	NE	SW	SE
Nov. 2023	**-2.25%**	-3.19	-1.89	-2.55	1.39%
Nov. 2024	**-7.09%**	-9.99	-4.78	-10.61	5.60%
Nov. 2025	**-5.70%**	-6.62	-3.89	-13.28	8.00%
Nov. 2030	**+17.02%**	19.03	16.35	8.54	24.42
Nov. 2040	+44.50%	46.20	43.03	33.48	59.91

Farmland Price Expectations, 12 Months Ahead

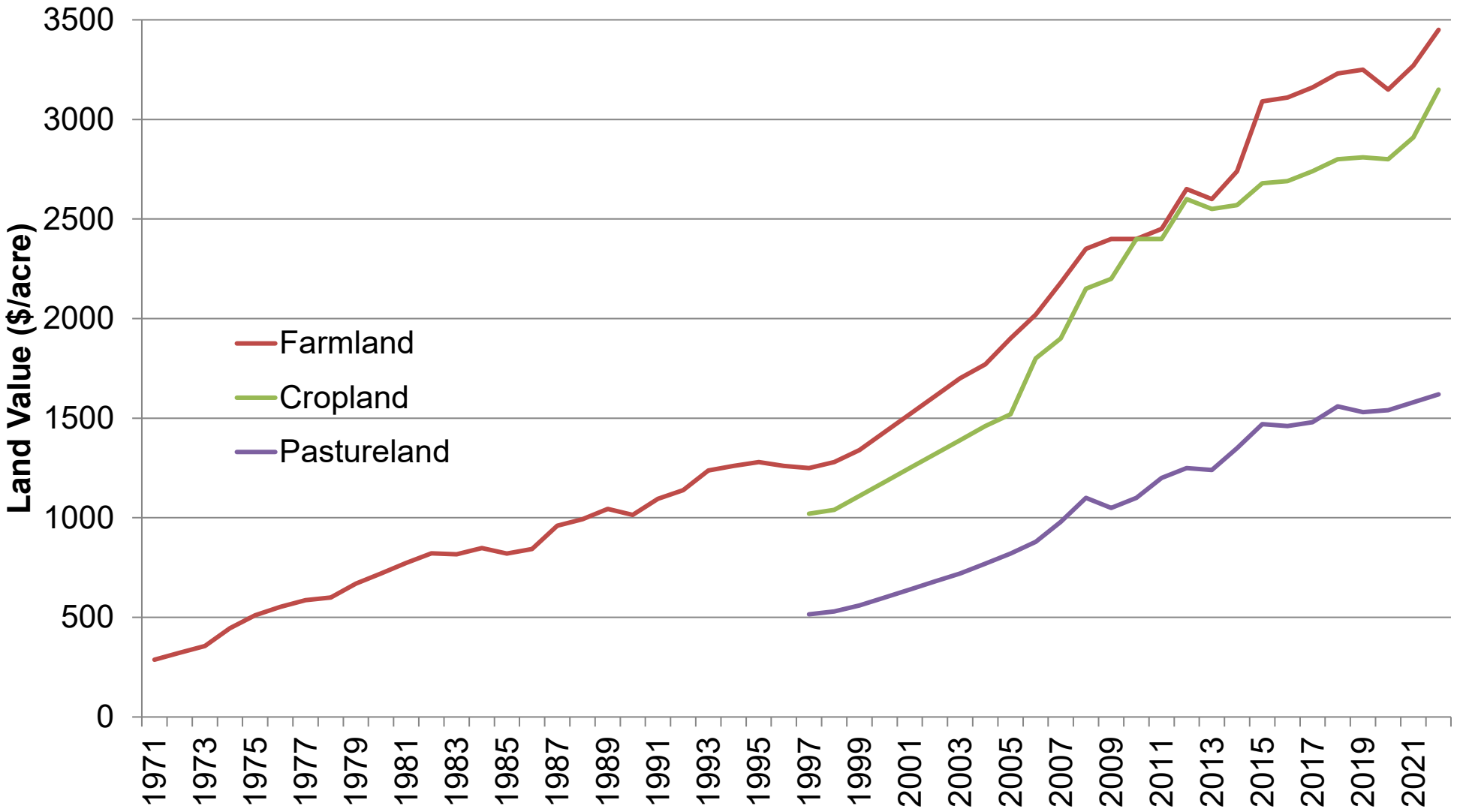
AG ECONOMY BAROMETER
PURDUE UNIVERSITY · CME GROUP



New York State Farmland Market Trends

Farmland Value Trends in NYS 1971-2022

Source: USDA NASS



55.56 acres of Plymouth County farmland sells for record $26,250 per acre

Mason Dockter Oct 12, 2022 Updated Oct 13, 2022 0

This aerial photo from the Brock Auction Company shows a parcel of Plymouth County land that was sold at auction Monday for a record-breaking $26,250 per acre.
Brock Auction Co.

https://siouxcityjournal.com/news/local/55-56-acres-of-plymouth-county-farmland-sells-for-record-26-250-per-acre/article_943c5735-b065-530e-8e7b-e7ae6b92b257.html

July 13, 2022

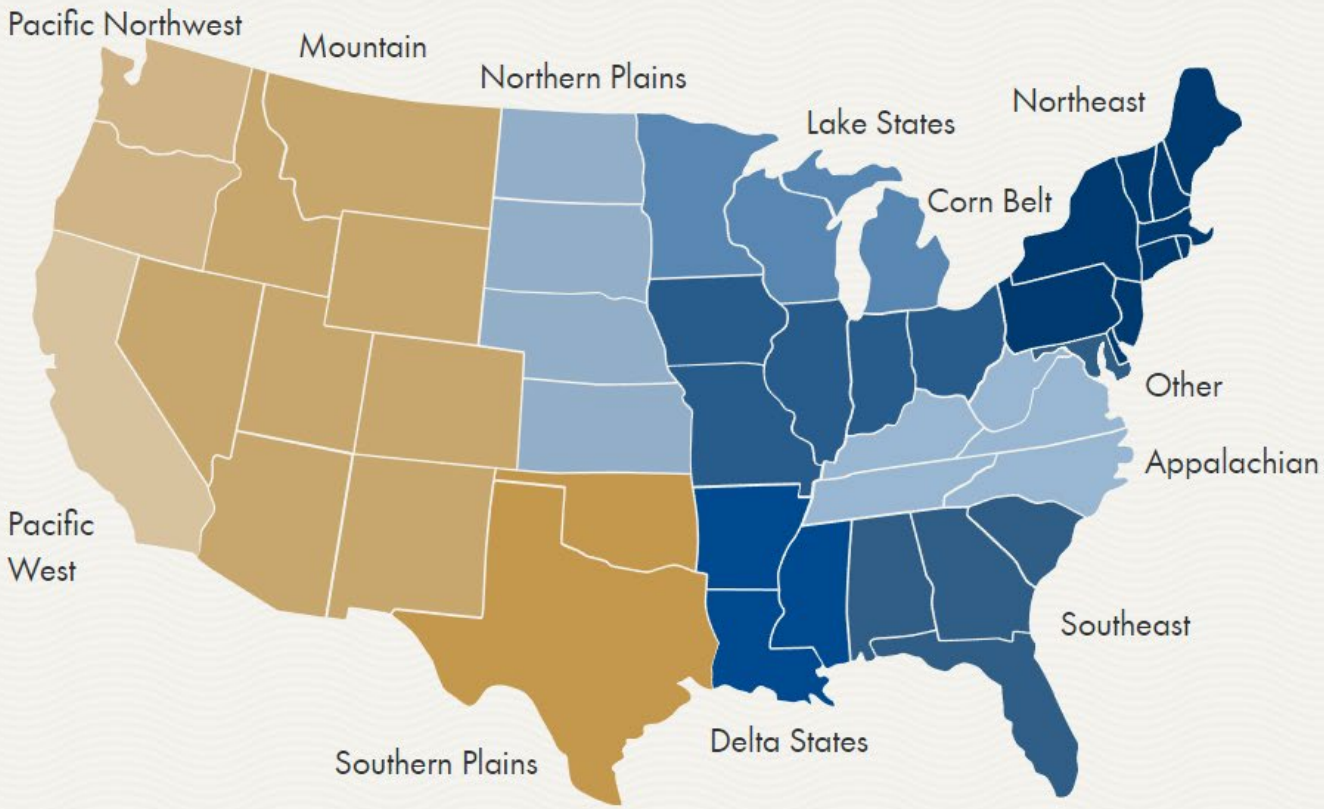
1340-A GEORGETOWN ROAD, QUARRYVILLE (24.656 ACRES)

24.656 Acre +/- Dairy Farm w/Stream & Pond – 2-Family Farmhouse – Bank Barn – Dairy Barn – Heifer Barn – Tobacco Barn – Corn Barn – Garage/Shop/Barn – Silos – Manure Pit – **Zoned General Business** – Georgetown/Nine Points/Green Tree Area $2,194,384

BROCHURE | MAP | PHOTOS | TOPOGRAPHICAL | ONLINE BIDDING

http://www.klinekreidergood.com/past-auctions

NCREIF Farmland Property Index



3rd Quarter 2022

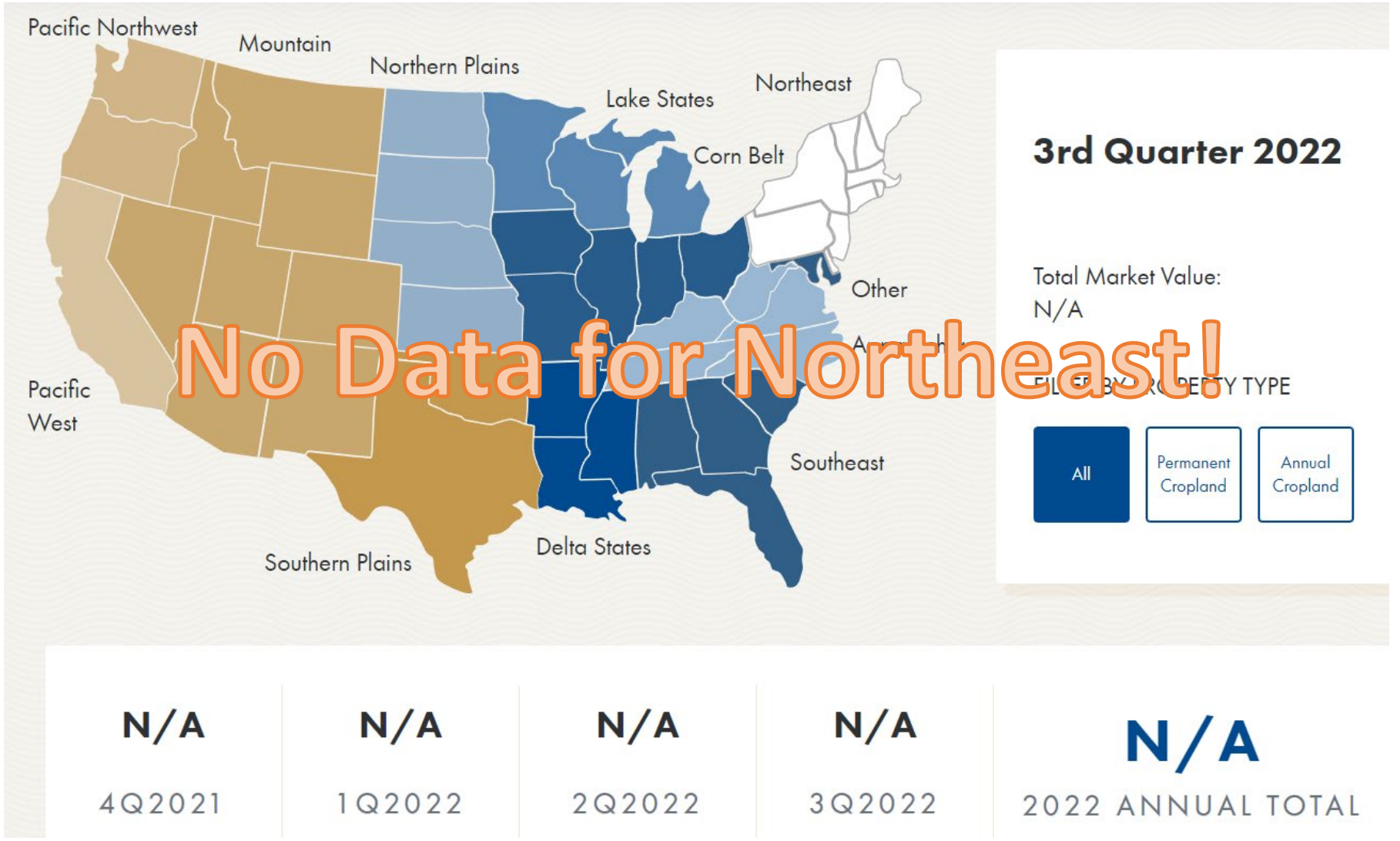
Total Market Value:
$14,859,663,577.00

FILTER BY PROPERTY TYPE

All | Permanent Cropland | Annual Cropland

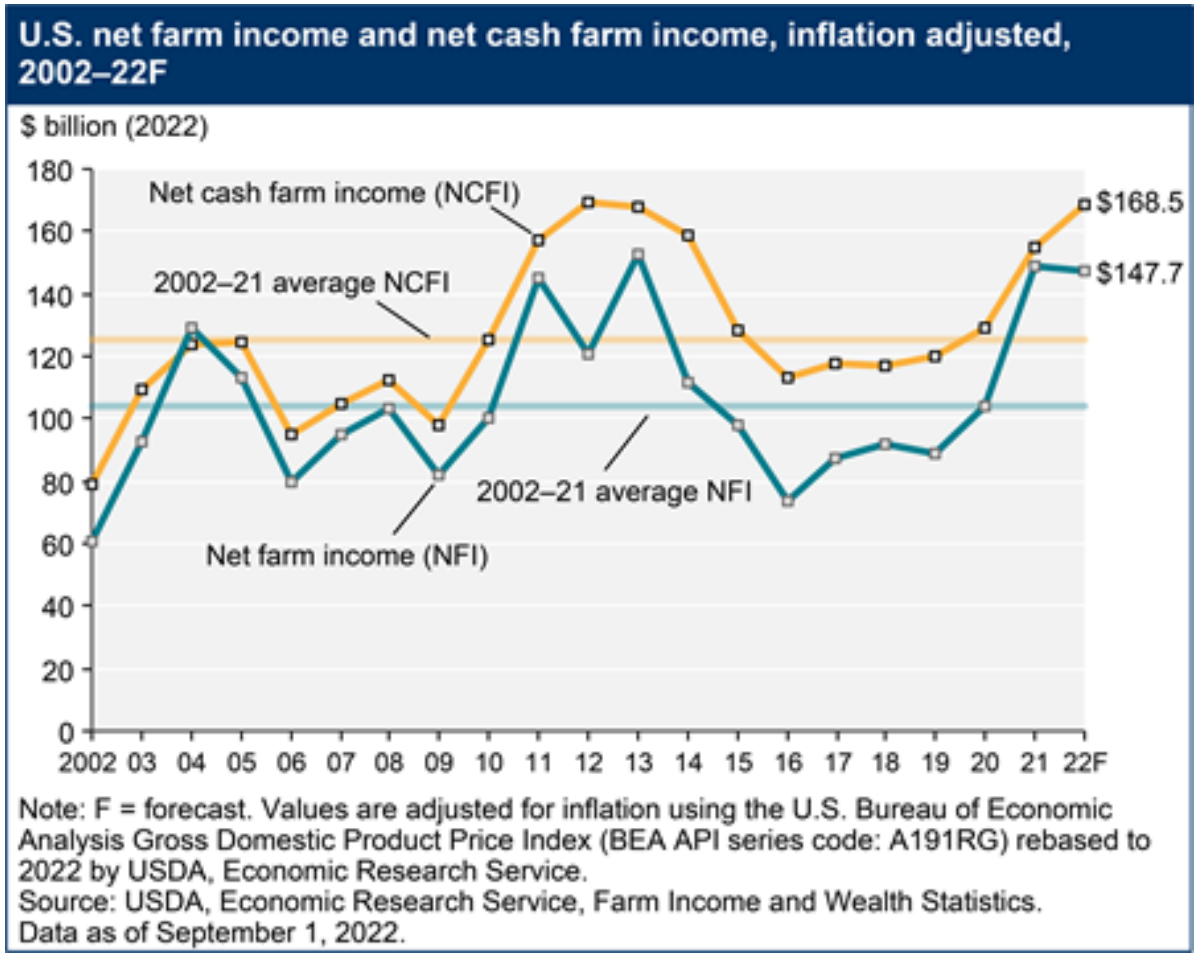
3.80%	2.63%	1.45%	1.98%	10.21%
4Q2021	1Q2022	2Q2022	3Q2022	2022 ANNUAL TOTAL

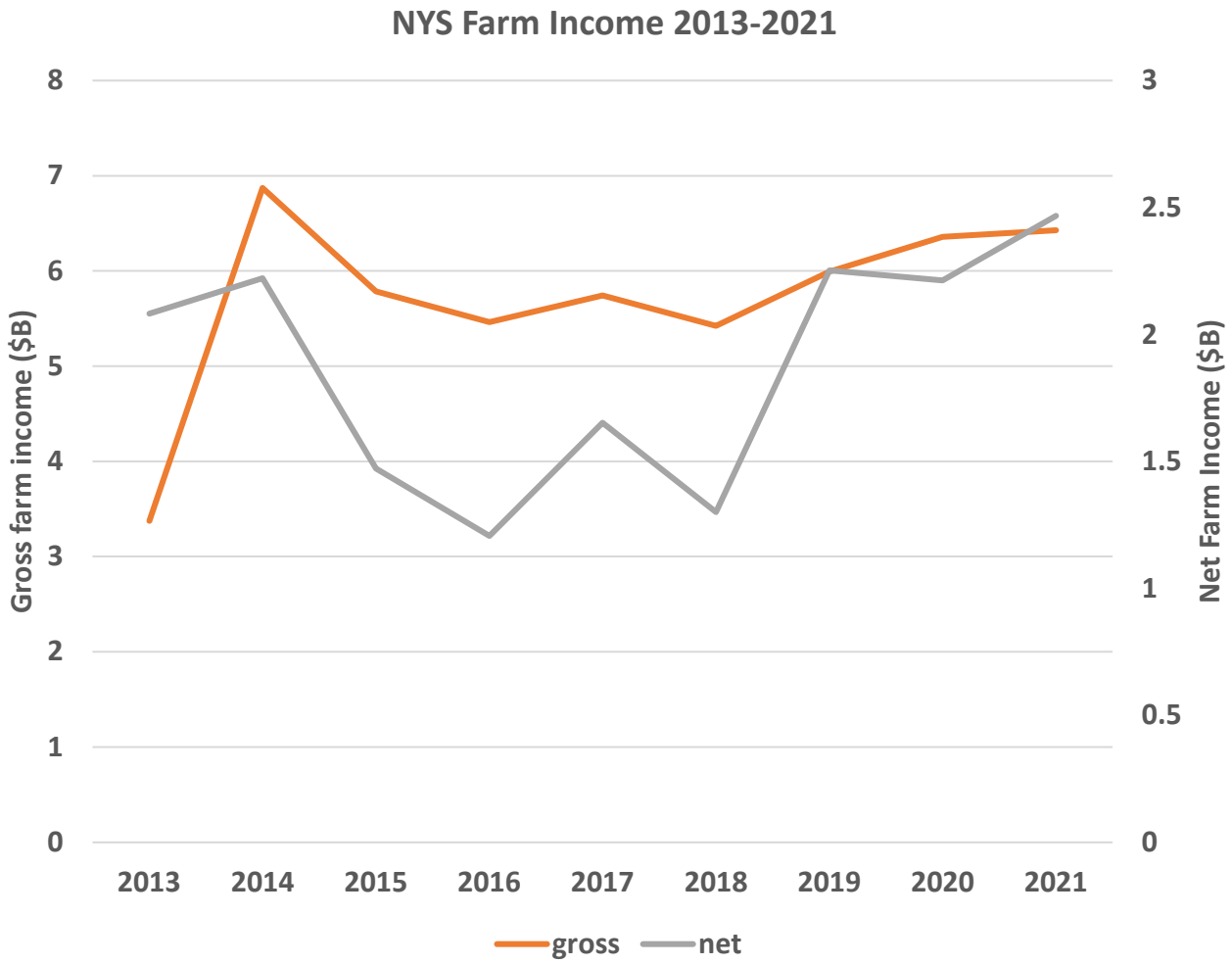
NCREIF Farmland Property Index



N/A	N/A	N/A	N/A	N/A
4Q2021	1Q2022	2Q2022	3Q2022	2022 ANNUAL TOTAL

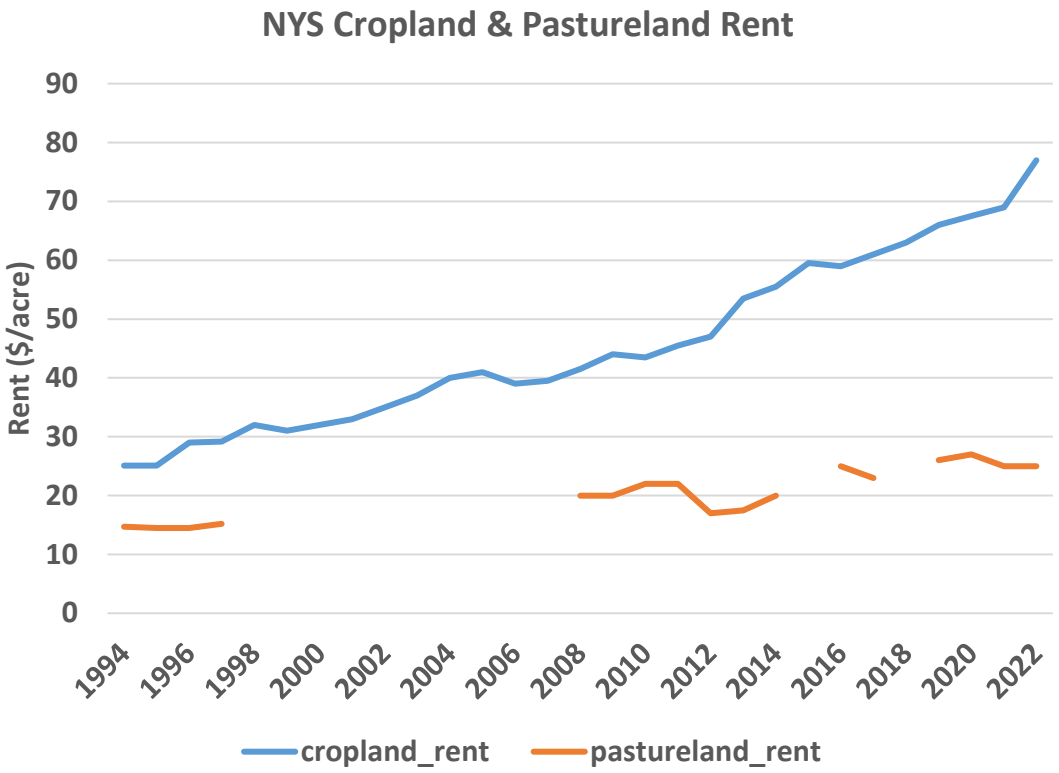
https://www.ncreif.org/data-products/farmland/

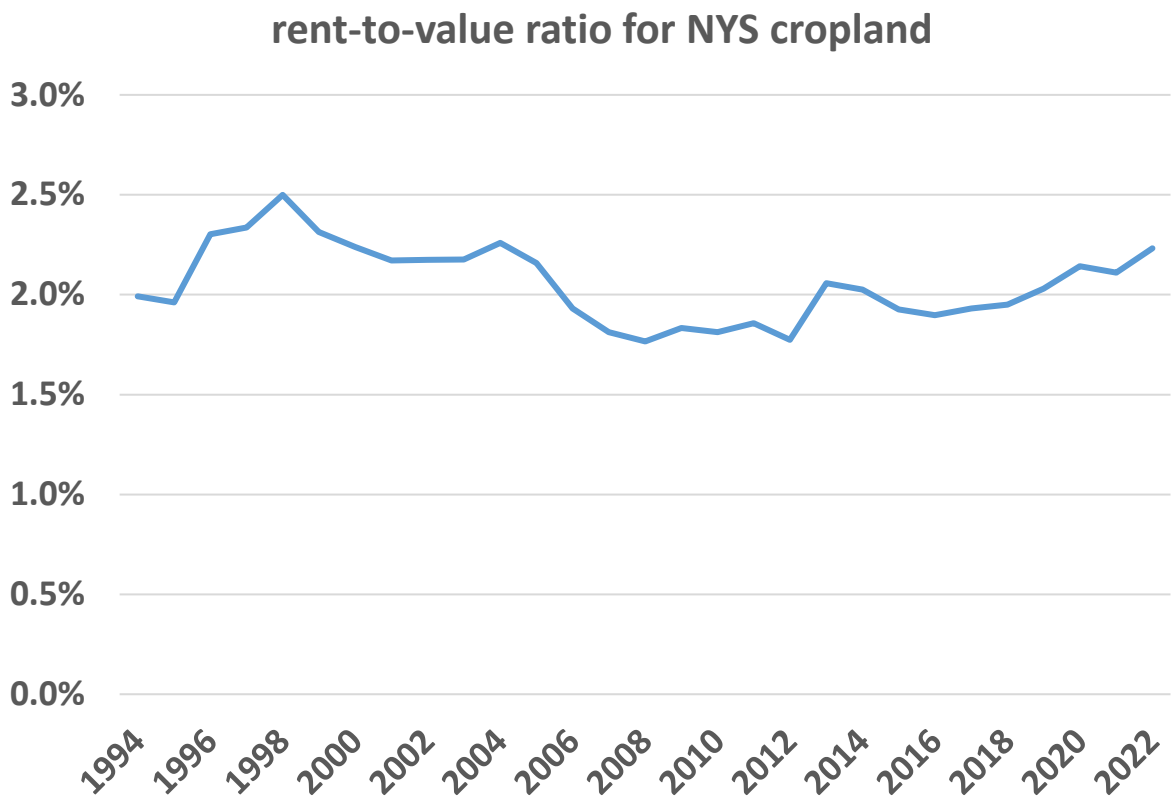

U.S. net farm income and net cash farm income, inflation adjusted, 2002–22F
$ billion (2022)
Net cash farm income (NCFI)
$168.5
$147.7
2002–21 average NCFI
2002–21 average NFI
Net farm income (NFI)
180
160
140
120
100
80
60
40
20
0
2002 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22F
Note: F = forecast. Values are adjusted for inflation using the U.S. Bureau of Economic Analysis Gross Domestic Product Price Index (BEA API series code: A191RG) rebased to 2022 by USDA, Economic Research Service.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of September 1, 2022.

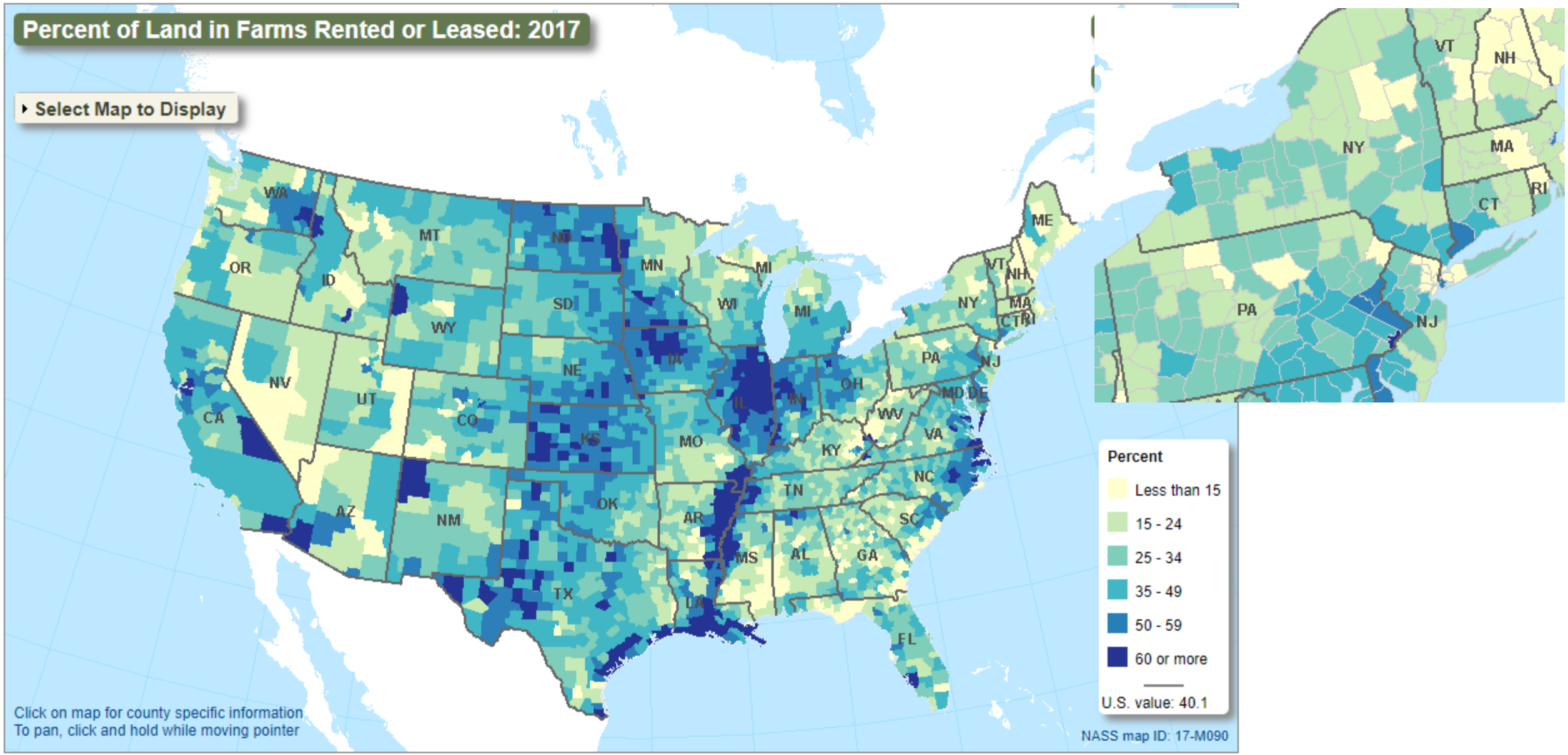

NYS Farm Income 2013-2021
Gross farm income ($B)
Net Farm Income ($B)
8
7
6
5
4
3
2
1
0
3
2.5
2
1.5
1
0.5
0
2013 2014 2015 2016 2017 2018 2019 2020 2021
gross
net

Cropland Rent & Rent-to-Value Ratio

USDA NASS June Area Survey







SS, 2017 Census of Agriculture

Central NY Farmland Cash Rental Rate Survey Findings

- https://dyson.cornell.edu/wp-content/uploads/sites/5/2021/09/EB-2021-02_Central-NY-Farmland-Cash-Rental-Rate-Survey-Findings-VD.pdf

Jennifer Ifft and Nicole Tommell

Table 1. Chenango County Results

	Low	Medium	High
		Cropland	
Rental rate	$31	$68	$105
Share of total cropland	28%	42%	30%
Average silage yield - tons/acre	13	18	24
		Pasture	
Rental rate	$22	$32	$43

64 people responded to the survey, but only 56 provided information on their occupation. The majority were farmers, but many other groups were represented. Each respondent listed the counties they were familiar with, for a total of 80 county-level observations

How to determine cropland rent – Iowa resource – Alejandro Plastina

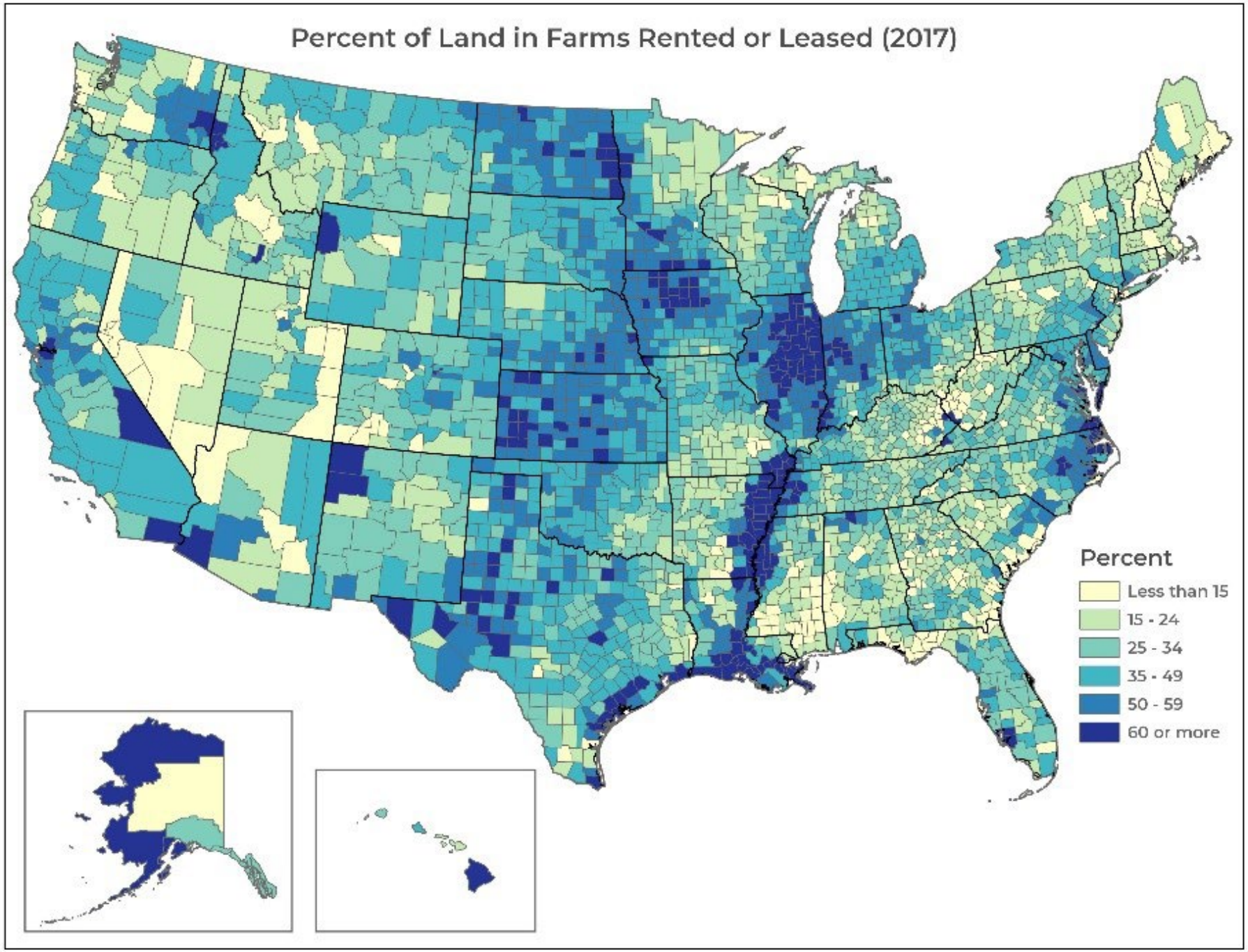
Presentation: Cash Rent Consideration
https://www2.econ.iastate.edu/faculty/plastina/presentations/Plastina-220210.pdf

Information File and Excel Decision Tool on How to Compute a Cropland Cash Rent
https://www.extension.iastate.edu/agdm/wholefarm/html/c2-20.html

Farm Building Rental Rate Survey (2014)
https://aglease101.org/wp-content/uploads/2020/10/NCFMEC-07.pdf

Custom Rate Survey
https://www.extension.iastate.edu/agdm/crops/pdf/a3-10.pdf

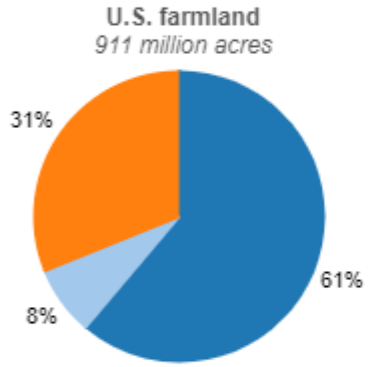
Farmland Ownership & Tenure Trends


Percent of Land in Farms Rented or Leased (2017)
Percent
Less than 15
15 - 24
25 - 34
35 - 49
50 - 59
60 or more

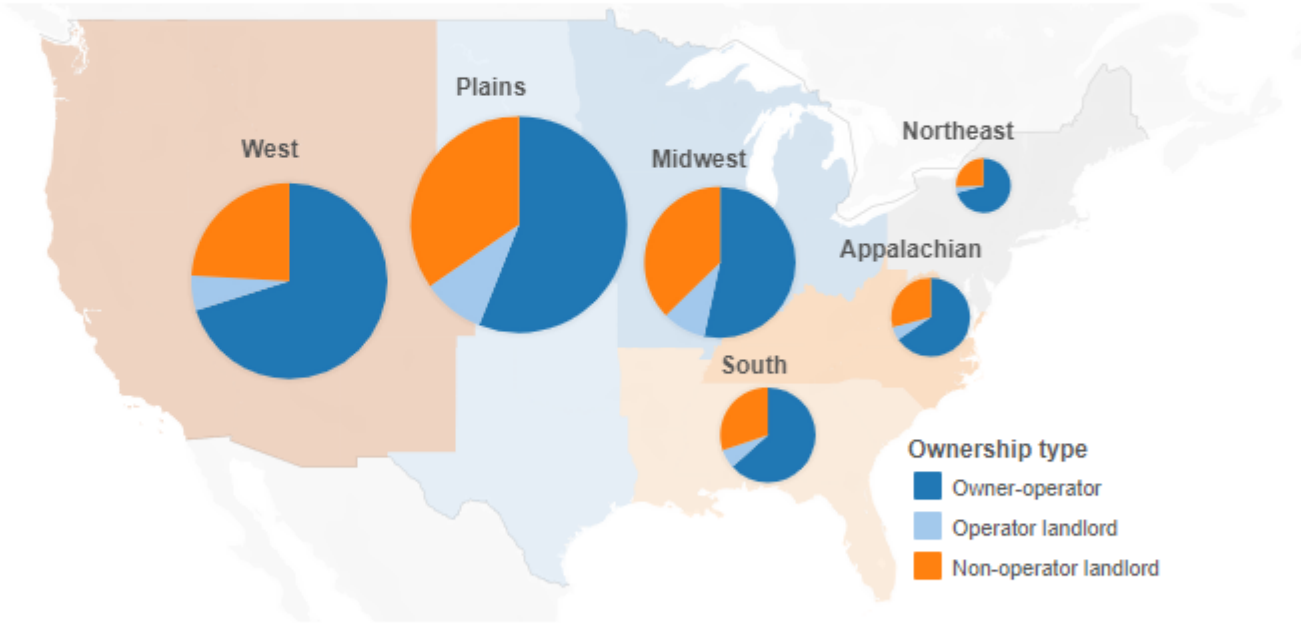
Visualizing U.S. Farmland Ownership, Tenure, and Transition

Farmland ownership and rental

In 2014, 61 percent of U.S. farmland was operated by the landowner. Renting farmland is more common in the Midwest and Plains regions. Farmland ownership is concentrated among older operators and landlords, and male operators.



***61 percent** of U.S. farmland is owner-operated, or owned by its respective farm operator. Eighty percent of rented land (**31 percent** of all farmland) is owned by non-operator landlords.*



Note: Survey data on farmland ownership is available for the United States and 6 regions; summary statistics do not include Alaska and Hawaii. Rented land includes land that is subleased.

Non-operator landlords are more likely to be of a relatively advanced age

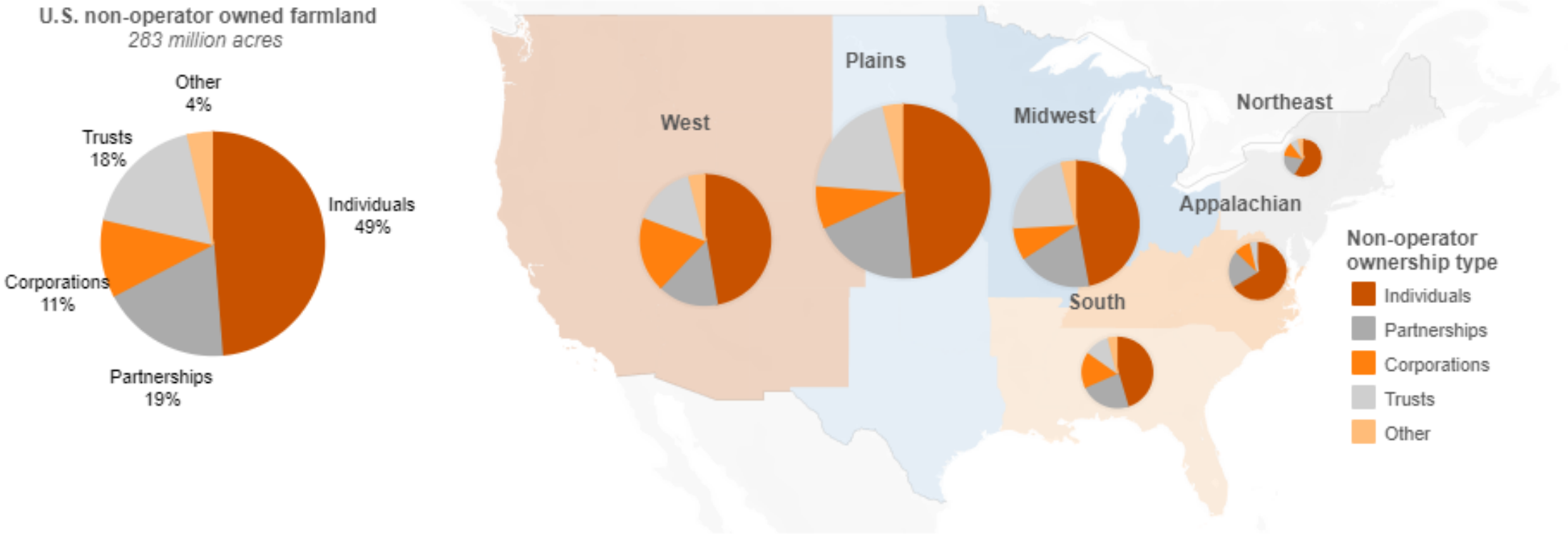
Operators 55 and older account for nearly 80 percent of all *owner-operated* land; almost 70 percent of all farmland owned by *non-operating landlords* is owned by people who are 65 and older. Nearly 90 percent of owner-operated land is associated with a male principal operator; non-operator owned acreage is more equally divided by gender.

Farmland acres owned (1,000)

USDA 2014 TOTAL Survey

Non-operator landlord ownership

Of the **31** percent of U.S. farmland that is owned by non-operator landlords (entities that own land in agricultural production but are not actively involved in farming), nearly half (accounting for **15** percent of all farmland) is held by individuals.



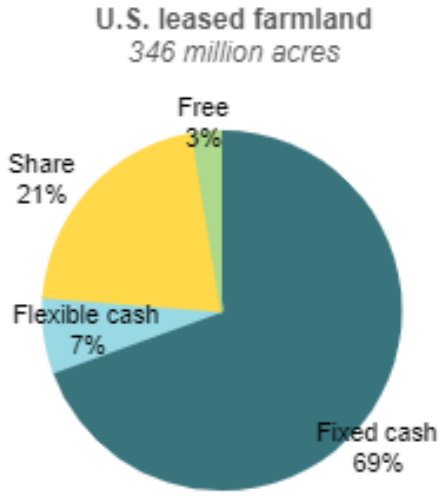
Note: Survey data on non-operator landlord ownership is available for the United States and 6 regions; summary statistics do not include Alaska and Hawaii. For the Appalachian region, "corporations" and "other" categories are combined to preserve survey respondent confidentiality. For the West region, the "partnerships" estimate based on TOTAL survey data has a large margin of error and should be interpreted with caution.

A majority of non-operators own a relatively small amount of farmland

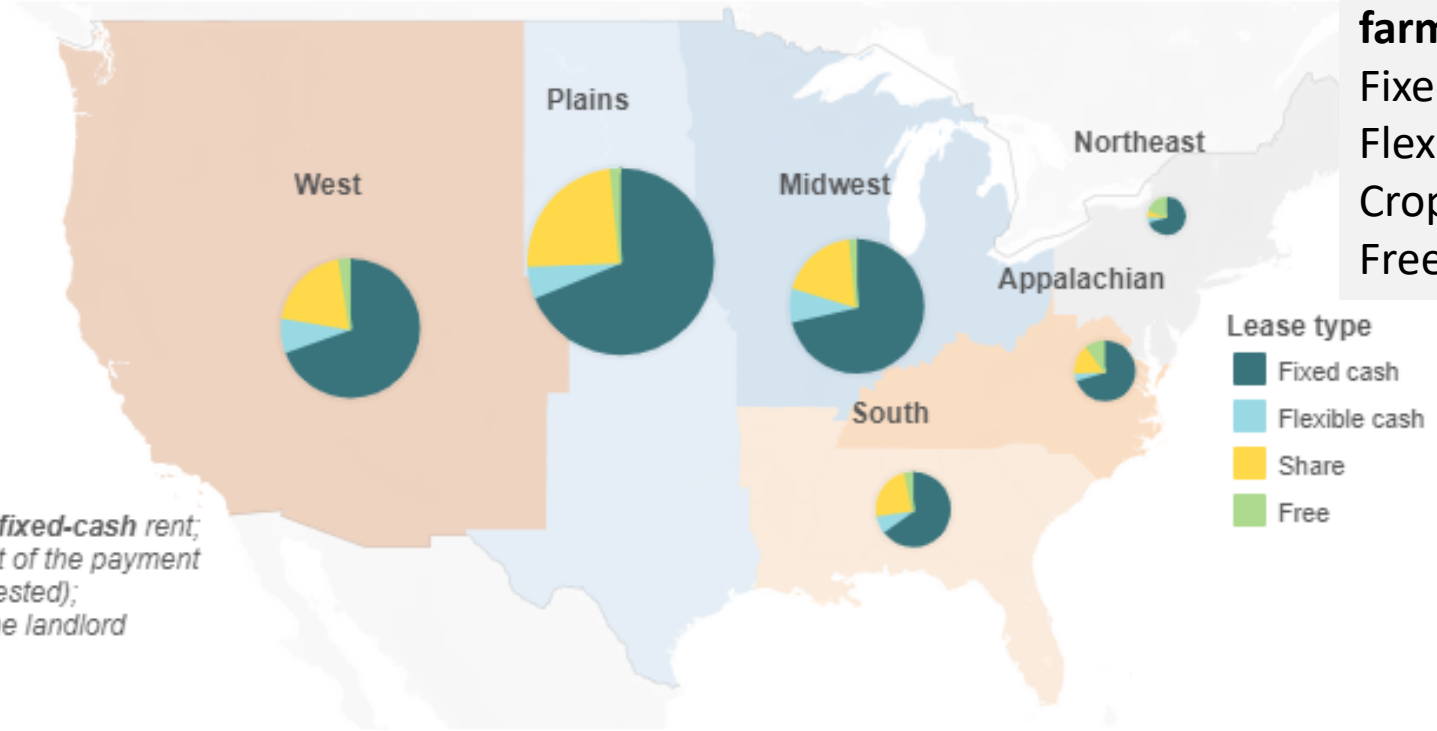
Eighty percent of non-operator landlords rented out less than 180 acres each, accounting for 29 percent of all land rented out by non-operators.

Land rental agreements

Across all regions and landlord ownership types, fixed-cash rental agreements are most common. Most leased farmland acres have been rented to the same tenant for over 3 years.



*There are four basic types of rental agreements: **fixed-cash** rent; **flexible-cash** rent (where, for example, all or part of the payment is based on prices or yields after the crop is harvested); production- or cost-**share** (where, for example, the landlord receives a portion of produced output); and **free**.*



Northeast leased farmland
Fixed Cash: 71%
Flexible Cash: 5%
Crop Share: 5%
Free: 19%

Note: Survey data on rental agreements is available for the United States and 6 regions; summary statistics do not include Alaska and Hawaii. The pie chart and map omit approximately 7.7 million acres of farmland owned by landlords who rent land out to more than three operators. In the TOTAL survey, landlords are ask to report contract choice for up to three of their tenants.

Most landlords have long-term relationships with their tenants

Over 80 percent of all U.S. rented farmland acres have been rented to the same tenant for over 3 years, and 38 percent have been rented for over 10 years. Most acres, however, are in lease agreements that are negotiated every year.

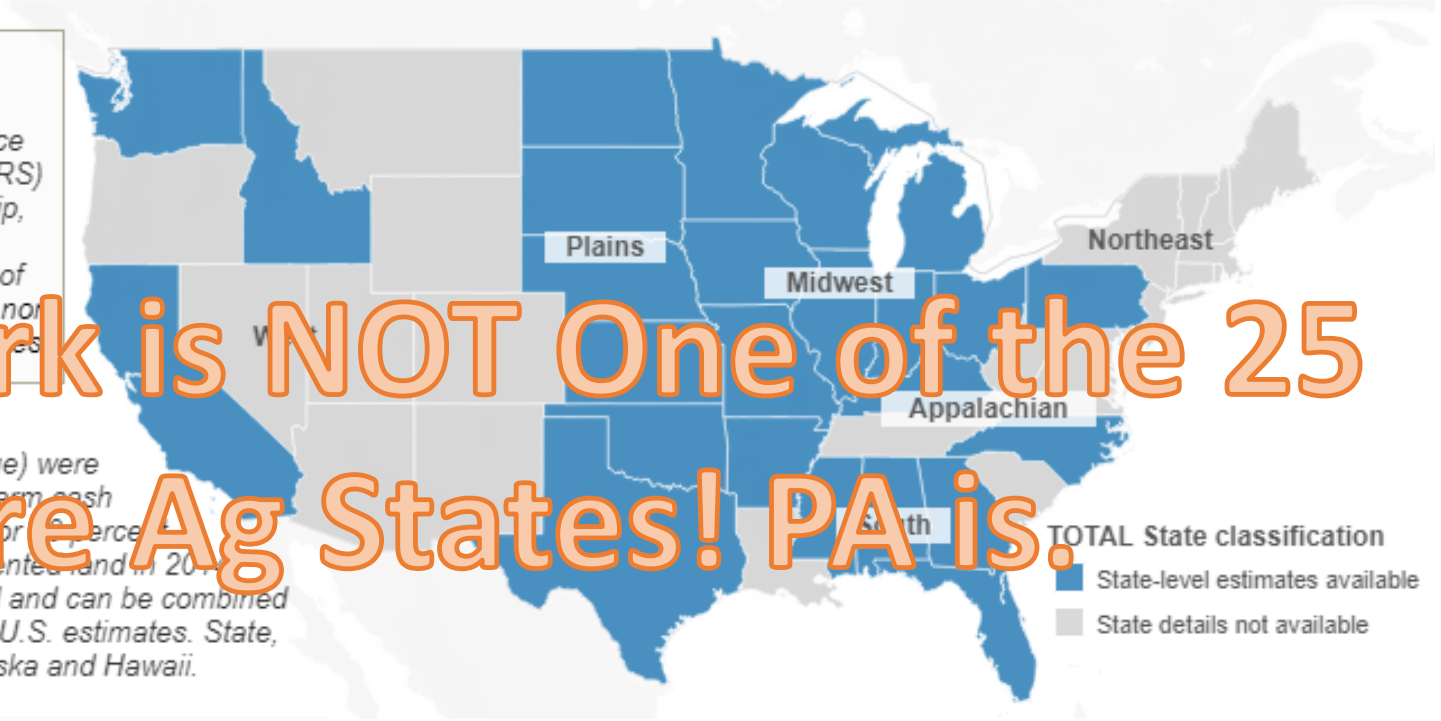
2014 Tenure, Ownership, and Transition of Agricultural Land (TOTAL) survey

Details about agricultural land for 25 States, 6 regions, and the contiguous United States

What is the TOTAL survey?

USDA's National Agricultural Statistics Service (NASS) and Economic Research Service (ERS) jointly conducted the 2014 Tenure, Ownership, and Transition of Agricultural Land (TOTAL) survey to shed light on the 911 million acres of agricultural land—held by both operator and non-operator landowners—in the contiguous United States.

The 25 TOTAL estimate States (shown in blue) were selected to represent over 85 percent of all farm cash receipts in the United States. They accounted for 87 percent of all agricultural land and 78 percent of all rented land in 2014. The remaining 23 States were also surveyed and can be combined with estimate States to provide regional and U.S. estimates. State, region, and U.S. statistics do not include Alaska and Hawaii.



New York is NOT One of the 25 Core Ag States! PA is.

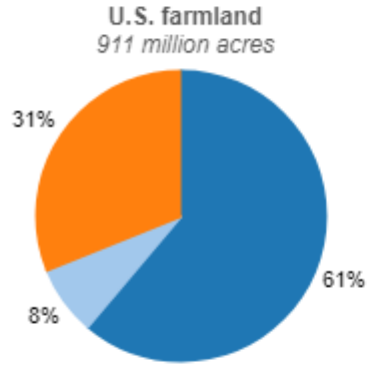
An example of the detail provided through TOTAL includes the ownership of land

Nearly 40 percent (353.8 million acres) of all U.S. farmland is rented or leased, and 80 percent of all rented farmland is owned by non-operator (non-farming) landlords. Most surveys about farming ask questions of the farm operator and do not survey non-operator landlords. In addition to providing information on land owned by farm operators, TOTAL, uniquely, surveys the non-operator landlords who own 31 percent of U.S. agricultural land.

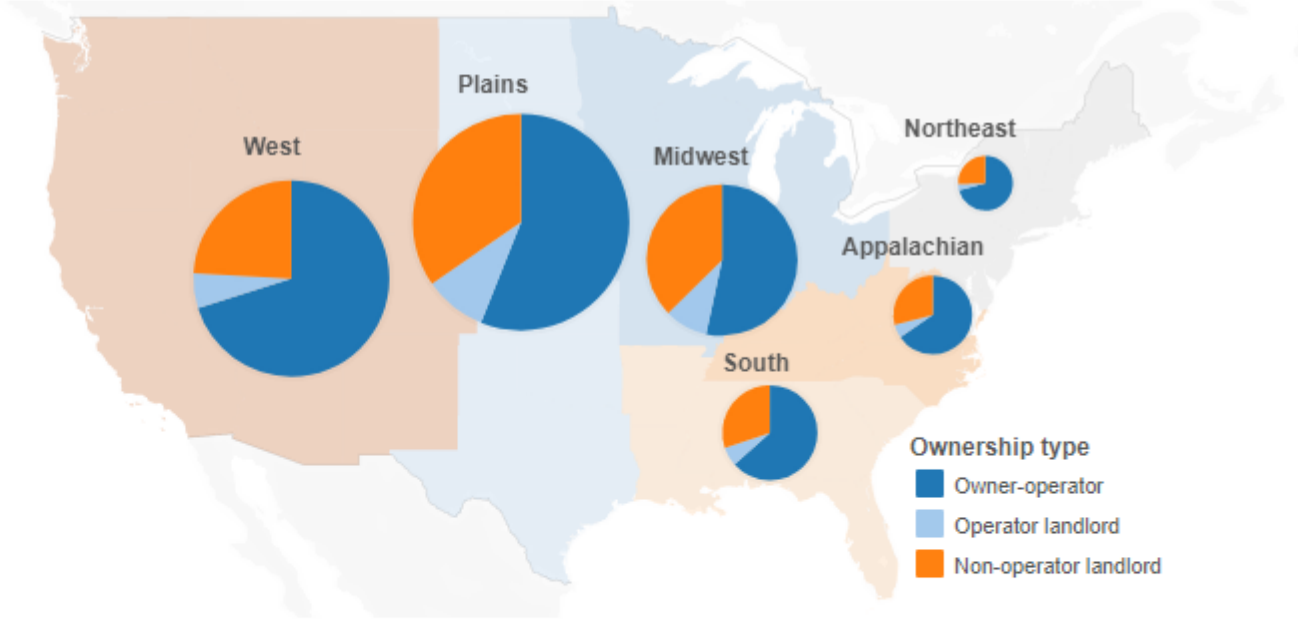
Visualizing U.S. Farmland Ownership, Tenure, and Transition

Farmland ownership and rental

In 2014, 61 percent of U.S. farmland was operated by the landowner. Renting farmland is more common in the Midwest and Plains regions. Farmland ownership is concentrated among older operators and landlords, and male operators.



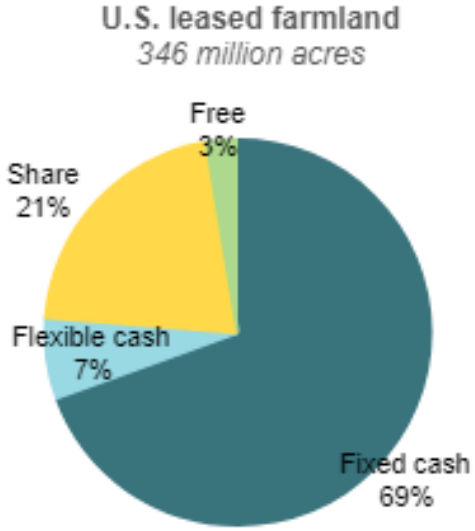
***61 percent** of U.S. farmland is owner-operated, or owned by its respective farm operator. Eighty percent of rented land (**31 percent** of all farmland) is owned by non-operator landlords.*



Note: Survey data on farmland ownership is available for the United States and 6 regions; summary statistics do not include Alaska and Hawaii. Rented land includes land that is subleased.

Non-operator landlords are more likely to be of a relatively advanced age

Operators 55 and older account for nearly 80 percent of all *owner-operated* land; almost 70 percent of all farmland owned by *non-operating landlords* is owned by people who are 65 and older. Nearly 90 percent of owner-operated land is associated with a male principal operator; non-operator owned acreage is more equally divided by gender.



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Free: 19%

https://www.ers.usda.gov/data-products/data-visualizations/other-visualizations/visualizing-us-farmland-ownership-tenure-and-transition/

Ongoing Collaborative Effort with the Northeast Chapter of ASFMRA to co-develop an annual Land Trends Report

American Society of Farm Managers & Rural Appraisers

North Texas

Land Use or Class	Value Ranges	Activity/Trend	Rental Range	Activity/Trend
Irrigated Cropland	$1,800 to $2,600	Stable/Increasing	$60 to $90	Stable/Stable
Class II & III Dry Crop	$1,100 to $1,800	Stable/Increasing	$30 to $50	Stable/Stable
Class IV & V Dry Crop	$900 to $1,000	Stable/Increasing	$18 to $30	Stable/Stable
Rangeland > 2,000 Acres	$800 to $1,500	Stable/Increasing	$8 to $12	Stable/Stable
Rangeland < 2,000 Acres	$1,200 to $3,000	Stable/Increasing	$8 to $15	Stable/Stable
Hunting Lease Rangeland			$6 to $15	Stable/Stable

Rangeland lease rates per animal unit year long range from $150 to $240

Central Texas

Land Use or Class	Value Ranges	Activity/Trend	Rental Range	Activity/Trend
Irrigated Cropland	$1,500 to $8,000	Decrease/Increasing		
Class II & III Dry Crop	$1,100 to $5,000	Decrease/Stable		
Class IV & V Dry Crop	$900 to $2,500	Stable/Stable		
Rangeland > 2,000 Acres	$950 to $2,000	Stable/Stable	$5 to $15	Stable/Stable
Rangeland < 2,000 Acres	$1,300 to $4,000	Stable/Increasing	$5 to $15	Stable/Stable
Hunting Lease Rangeland			$6 to $20	Stable/Increasing

Rangeland lease rates per animal unit year long range from $150 to $240

Each region has its unique land use or class

Far West Texas

Land Use or Class	Value Ranges	Activity/Trend	Rental Range	Activity/Trend
Rangeland	$295 to $799	Limited/Stable	$0.70 to $1.00	Stable/Stable
Dell City Irrigated Cropland*	None	No Activity	$85 to $120	Stable/Stable
El Paso Upper Valley Irrigated*	None	No Activity	n/a*	Limited Activity
El Paso Lower Valley Irrigated*	None	No Activity	n/a*	Limited Activity
Van Horn Irrigated Cropland*	None	No Activity	n/a*	Limited Activity

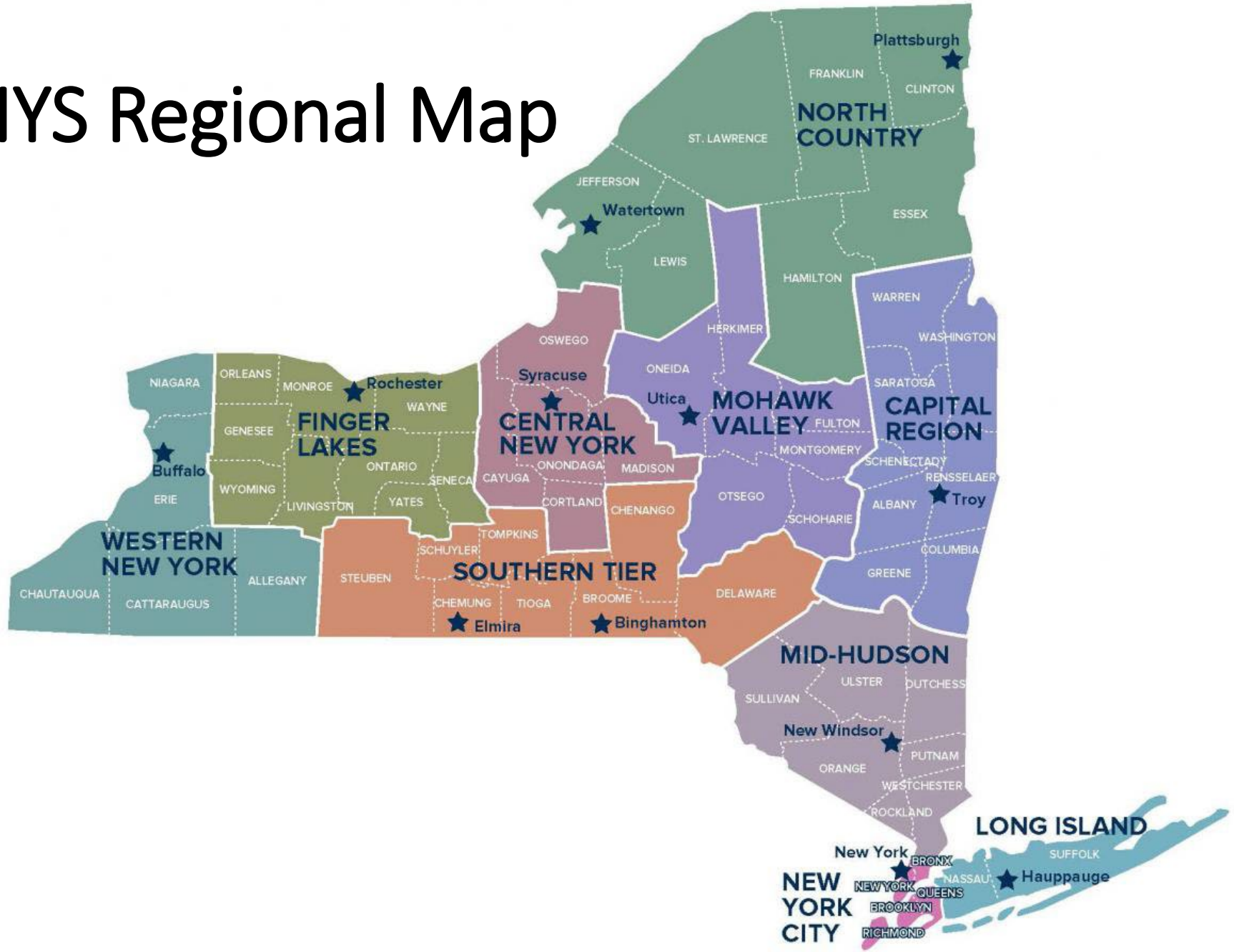
* Little to no new (2022) data available.

Big Bend

Land Use or Class	Value Ranges	Activity/Trend	Rental Range	Activity/Trend
Davis Mountains Rangeland*	$1,450 to $1,850	Slow/Stable	$3.50 to $5.00	Stable/Stable
Highlands Rangeland*	$950 to $980	Stable/Stable	$2.50 to $3.00	Stable/Stable
Desert Mountains Rangeland*	$201 to $385	Stable/Decreasing	$1.00 to $1.50	Stable/Stable

* Very limited 2022 data available.

Possible NYS Regional Map



- Empire State Development

Investor and Foreign Land Ownership

Why Investors Buy Farmland?

- Beta
  - The risk of a well-diversified portfolio depends on the market risk of the investments included in the portfolio
  - Beta (β) measures the sensitivity of an individual investment to market movements (Market: S&P 500)
  - Farmland, Indiana: 0.107
  - Individual Farms, Kansas: 0.064

Excess Returns

- Farmland, Indiana:
  - 0.06 to 0.08
- Individual Farms, Kansas:
  - Average = 0.018
  - Top quartile = 0.057

Source: Michael Langemeier, Purdue University

TOTAL CROPLAND RETURN

Region	1-year	5-year	10-year	15-year	20-year
Appalachia	10.18%	4.61%	4.24%	3.40%	5.28%
Corn Belt	**15.09%**	**7.12%**	**6.45%**	**7.95%**	**9.08%**
Delta	**8.41%**	**6.04%**	**6.61%**	**6.80%**	**8.17%**
Lake States	**13.91%**	**6.13%**	**6.56%**	**6.27%**	**7.89%**
Mountain	11.86%	6.61%	6.87%	5.45%	8.27%
Northeast	8.10%	4.14%	3.45%	1.76%	4.59%
Northern Plains	20.29%	8.01%	8.59%	10.93%	11.80%
Pacific Northwest	**13.46%**	**9.75%**	**9.87%**	**9.86%**	**11.17%**
Pacific West	**11.27%**	**8.13%**	**7.90%**	**7.02%**	**9.04%**
Southeast	**8.81%**	**4.55%**	**4.37%**	**3.04%**	**5.22%**
Southern Plains	12.19%	7.37%	6.46%	6.46%	8.11%
NCREIF Total Farmland	10.21%	6.54%	8.99%	10.30%	12.78%
NCREIF Annual Cropland	14.43%	8.00%	7.77%	9.46%	11.14%
NCREIF Permanent Cropland	4.05%	4.42%	10.83%	11.67%	14.74%

Source: USDA, NCREIF, and TIAA Center for Farmland Research

Source: Bruce Sherrick (U. Illinois); Peoples Company Data Source: USDA NASS, NCREIF

Foreign ownership of US farmland

Daily Mail .com News

Share 123 shares

Florida Gov. Ron DeSantis calls out the Chinese Communist Party for buying giant chunks of farmland and property in his state, saying it's a 'huge problem'

By Stephen M. Lepore For Dailymail.Com
15:57 EDT 23 Jul 2022 , updated 21:12 EDT 23 Jul 2022

Forbes

TOM COTTON
SENATOR FOR ARKANSAS

AUGUST 02, 2022

COTTON, TUBERVILLE INTRODUCE BILL TO PROHIBIT THE CHINESE COMMUNIST PARTY FROM PURCHASING AMERICAN LAND

FOR IMMEDIATE RELEASE

Contact: James Arnold or Mary Collins Atkinson (202) 224-2353

August 2, 2022

Santabarbara Seeks to Ban Foreign Adversaries from Buying Agricultural Land in New York State

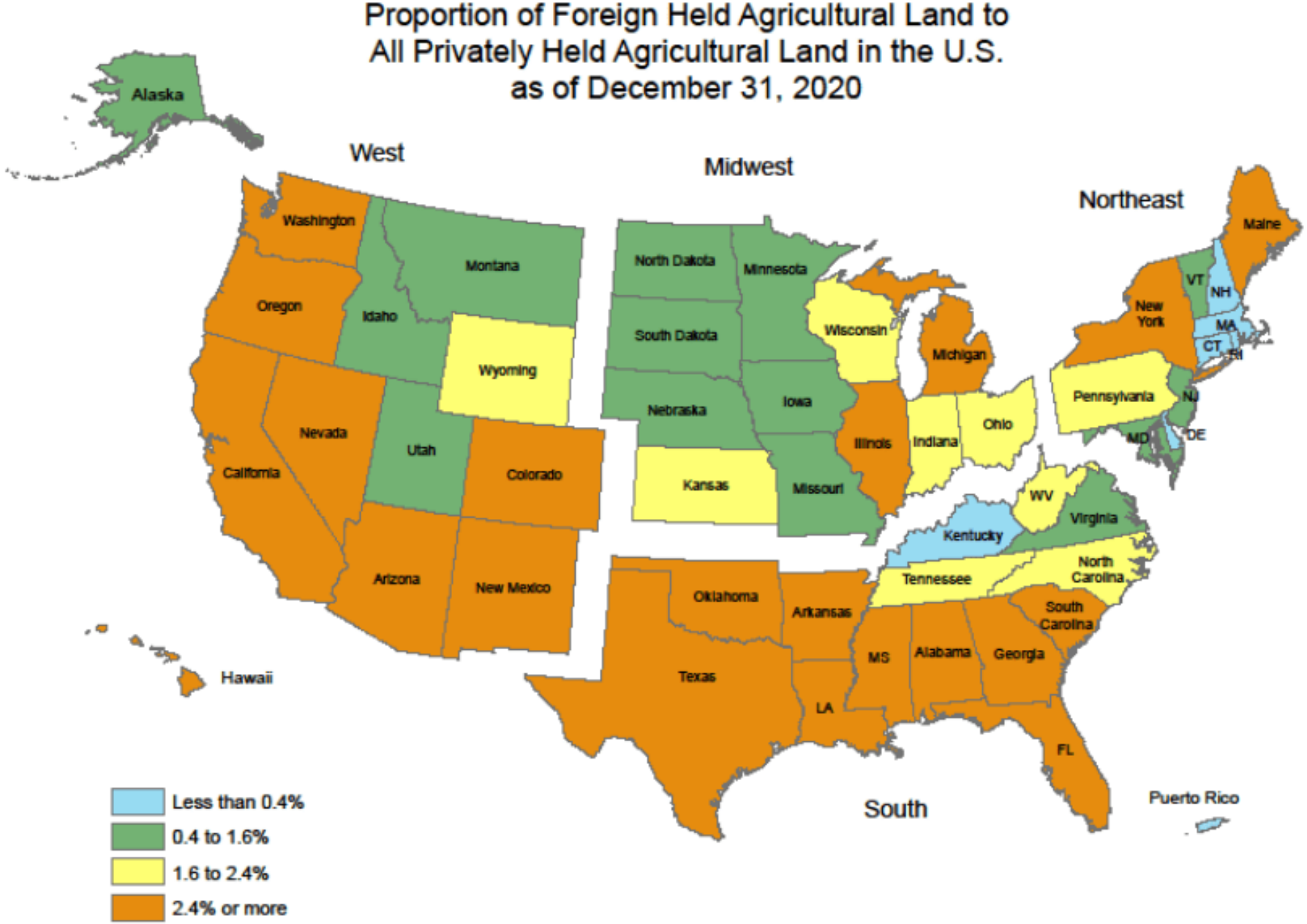
Estimates from 2020 indicate China already owns about 192,000 agricultural acres in the United States

April 6, 2023

Assemblyman Angelo Santabarbara, Chair of the New York State Assembly Commission on Rural Resources and long-standing member of the Assembly Committee on Agriculture has introduced a bill which would ban entities owned by foreign adversaries from purchasing agricultural land in New York State.

This list would include China, Cuba, Iran, North Korea, Russia, Venezuela, and any other country or individual deemed by the Secretary of Commerce to have engaged in a long-term pattern of serious instances of conduct significantly adverse to the national security of the United States or entities in which a foreign adversary has a controlling interest in, from purchasing agricultural land in New York State. The bill also requires that the Department of Agriculture and Markets compile a report that details the total amount of agricultural land that is under foreign ownership, the percentage change from previous years, and the purpose for which foreign-owned agricultural land is being used.

Figure 1


Proportion of Foreign Held Agricultural Land to
All Privately Held Agricultural Land in the U.S.
as of December 31, 2020
Alaska
West
Midwest
Northeast
South
Washington
Oregon
California
Idaho
Nevada
Montana
Wyoming
Utah
Colorado
Arizona
New Mexico
North Dakota
South Dakota
Nebraska
Kansas
Minnesota
Iowa
Missouri
Wisconsin
Illinois
Michigan
Indiana
Ohio
Maine
VT
NH
New York
MA
CT
RI
Pennsylvania
NJ
MD
DE
WV
Virginia
Kentucky
Tennessee
North Carolina
South Carolina
Oklahoma
Arkansas
Texas
MS
Alabama
Georgia
LA
FL
Hawaii
Puerto Rico
Less than 0.4%
0.4 to 1.6%
1.6 to 2.4%
2.4% or more

Foreign holdings of cropland and forest land as of December 2020

- USDA AFIDA report

Figure 4

County Concentration of Foreign Holdings of Crop Land
as of December 31, 2020

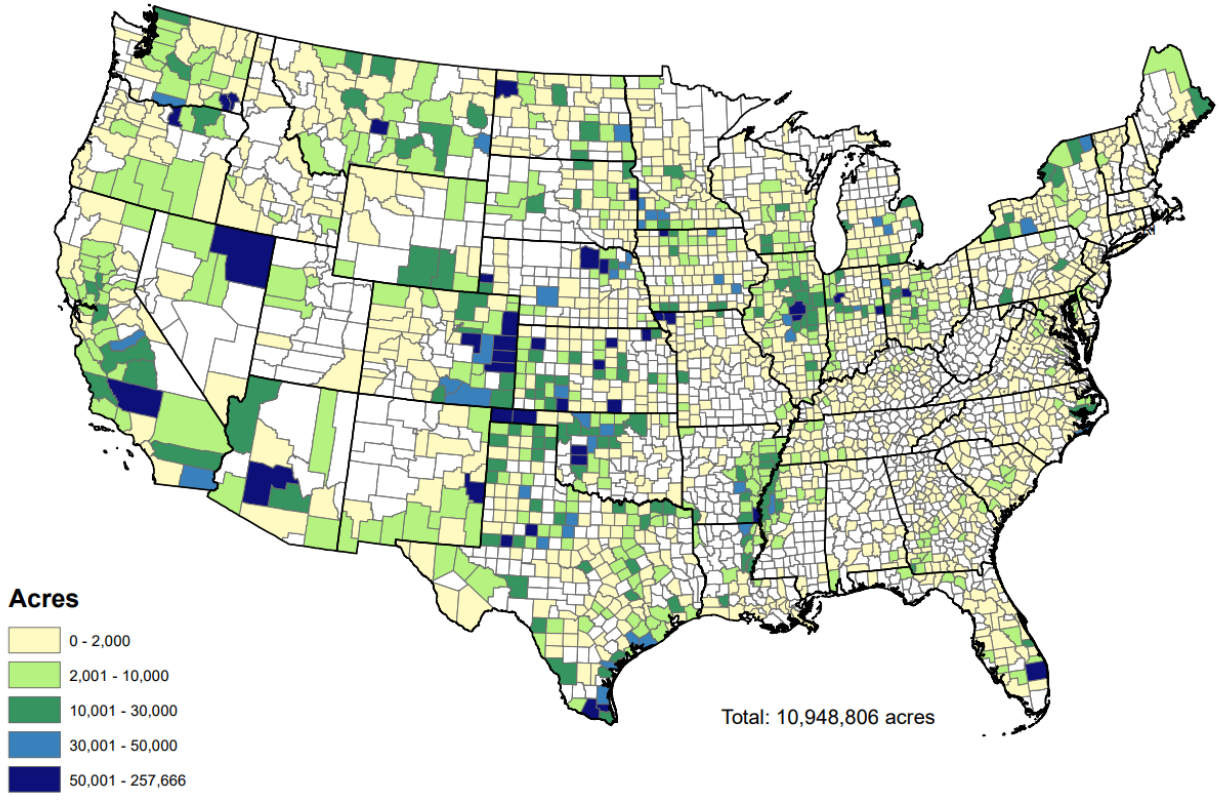
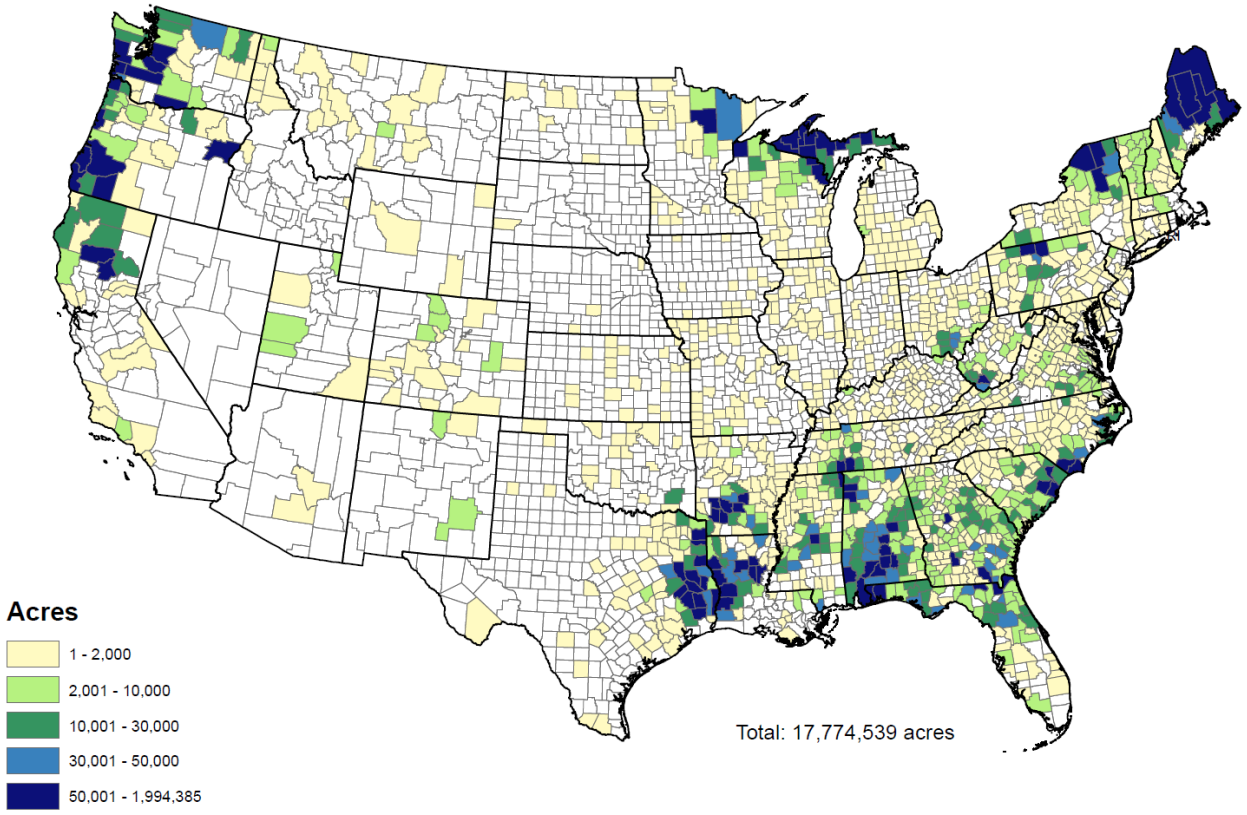


Figure 6

County Concentration of Foreign Holdings of Forest Land
as of December 31, 2020



Forbes

Sub

Why A Secretive Chinese Billionaire Bought 140,000 Acres Of Land In Texas

John Hyatt Forbes Staff

I write about wealth, billionaires and their companies.

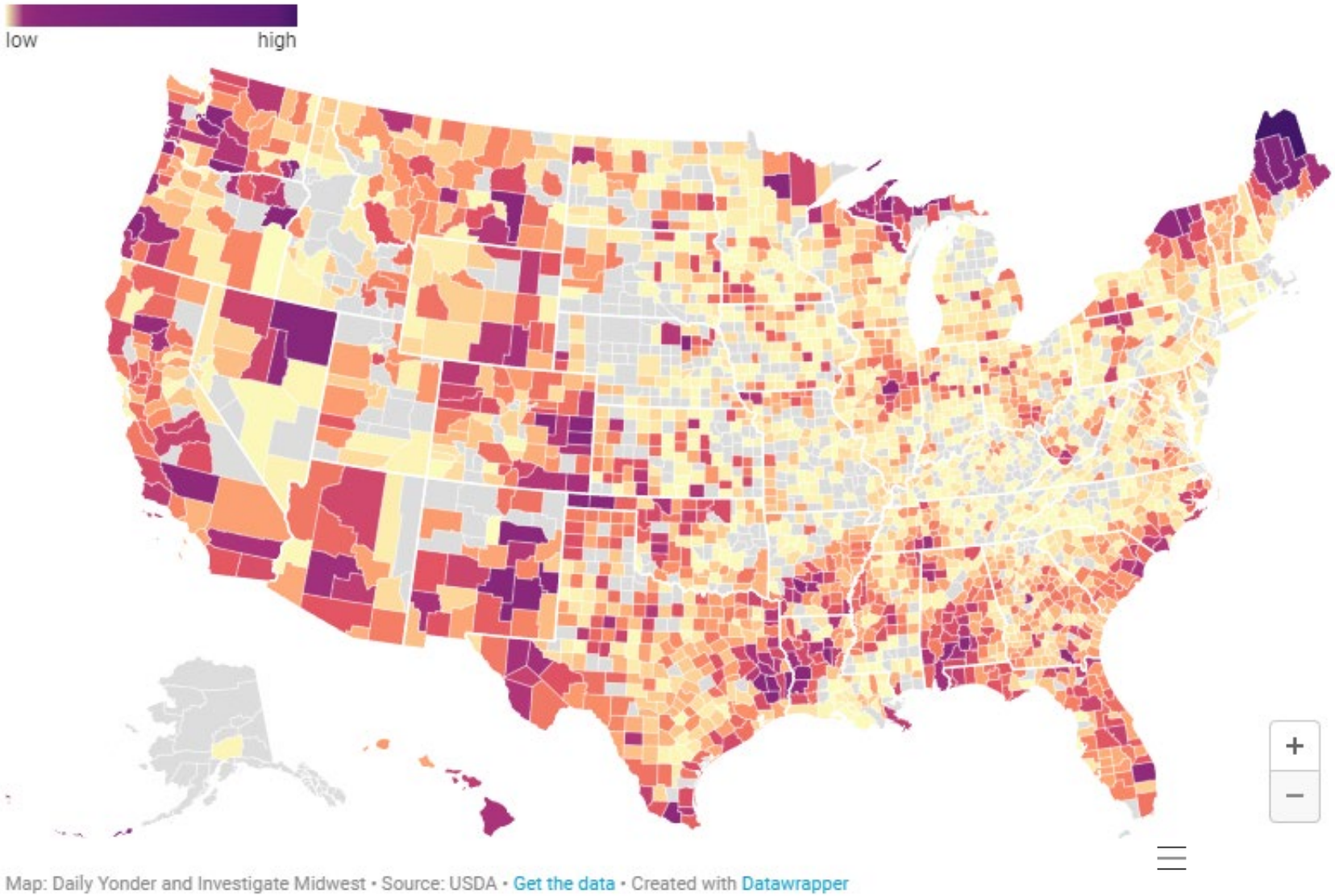
Aug 9, 2021, 07:10am EDT

The inside story of Sun Guangxin's plan for a wind farm in the Lone Star state and how it incurred the wrath of U.S. lawmakers and environmentalists, becoming a flashpoint in U.S.-China relations.

Despite the political firestorm, he intends not only to keep GH America's land, but to lease it to other companies to build and operate solar panels and the Blue Hills Wind Development

https://www.forbes.com/sites/johnhyatt/2021/08/09/why-a-secretive-chinese-billionaire-bought-140000-acres-of-land-in-texas/?sh=2d8de27a78c3

Acreage of Foreign-Owned Farmland by County



Map: Daily Yonder and Investigate Midwest • Source: USDA • Get the data • Created with Datawrapper

Kern County, California

Number of Foreign Onwers: 139
Total Foreign-Owned Acres: 140,904

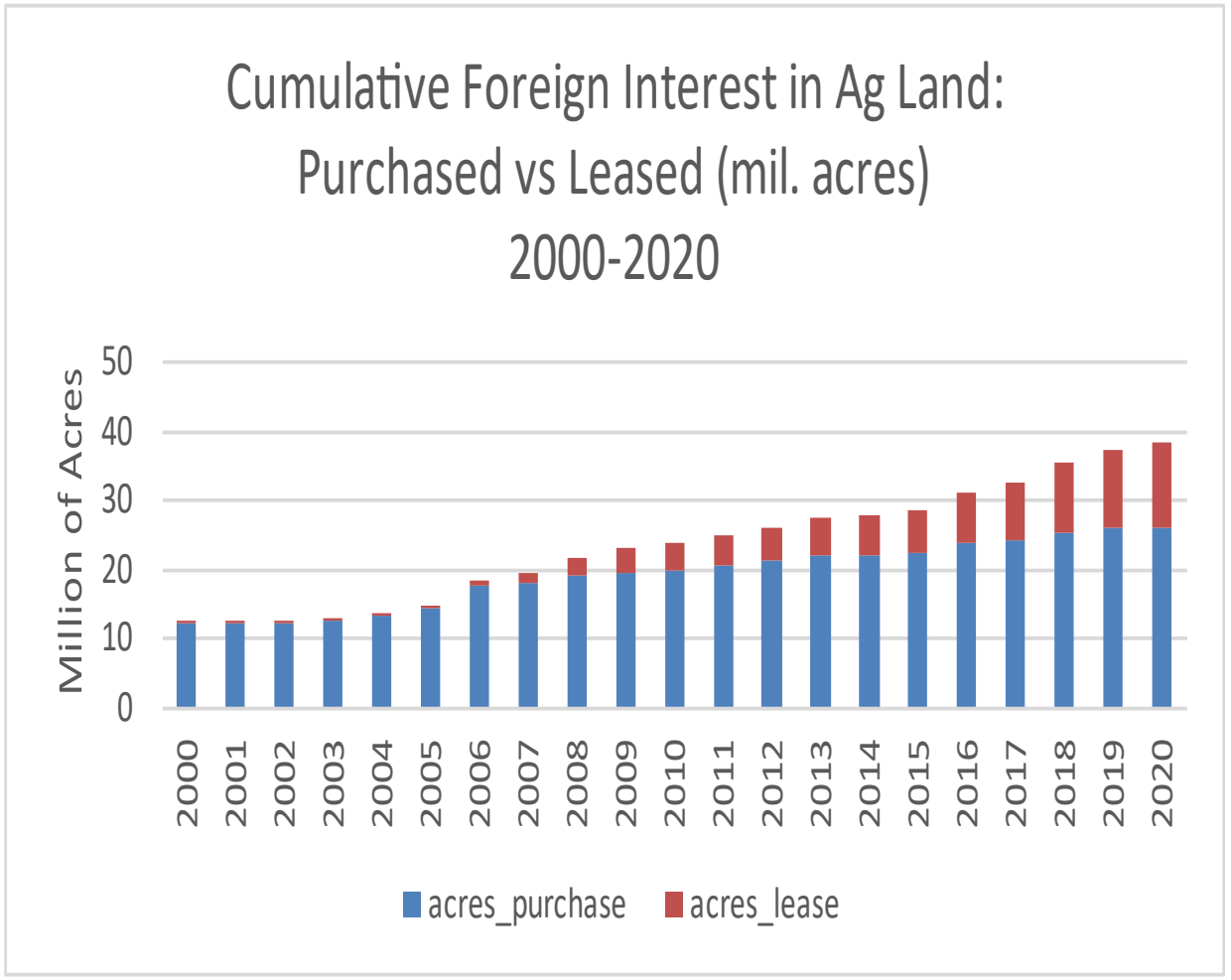
Largest Owners (up to 5)

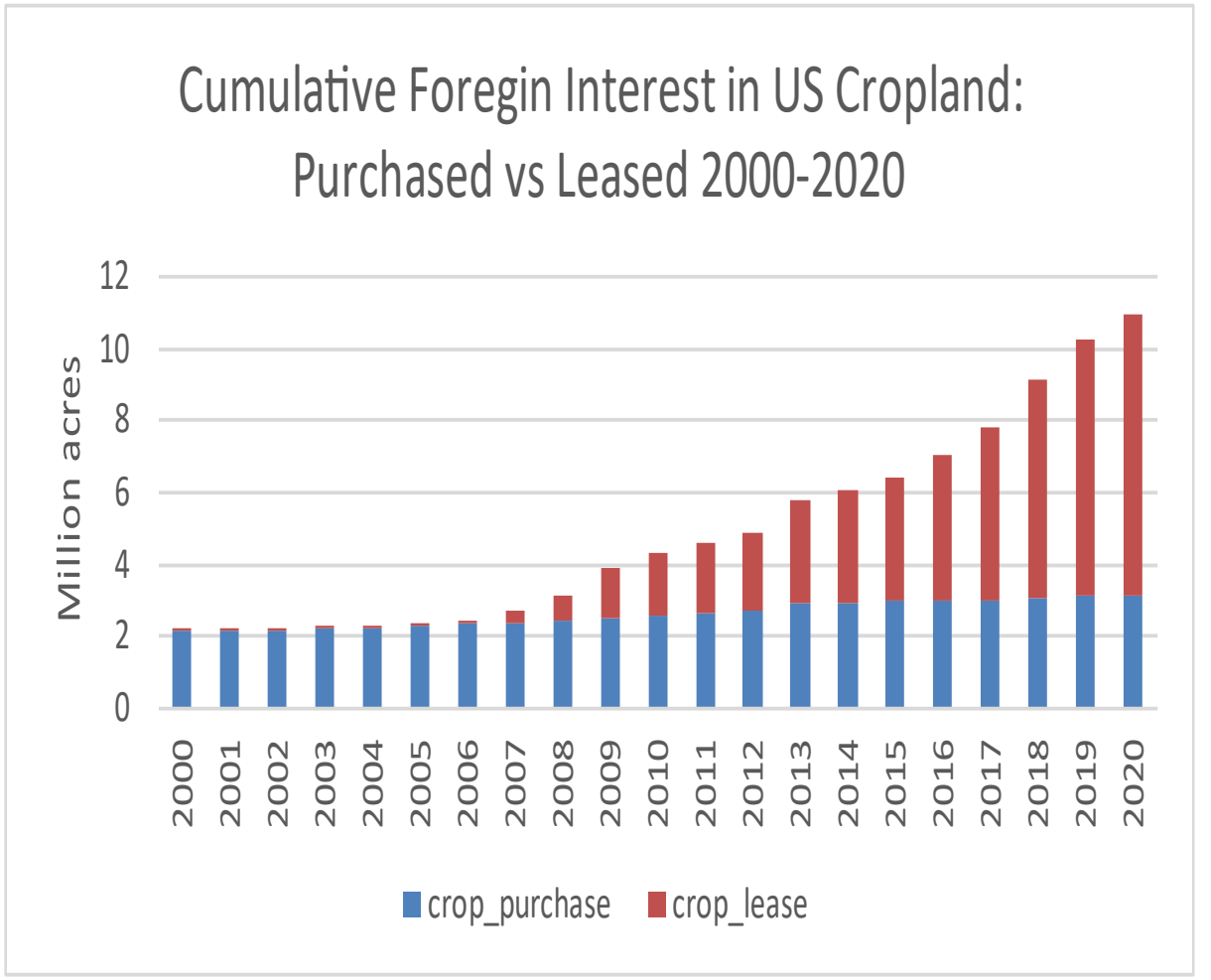
Owner	Nation	Acres
Aera Energy L.L.C.	NLD	36,976
Edf Renewable Development Corp. Fka Enxco Development Corp.	FRA	14,314
Blackwell Land Co., Inc.	GBR	11,553
Paloma Farms, Inc	JPN	5,861

https://investigatemidwest.org/2022/04/19/foreign-investment-in-us-cropland-nearly-triples-in-past-decade-usda-data-shows/

WSJ

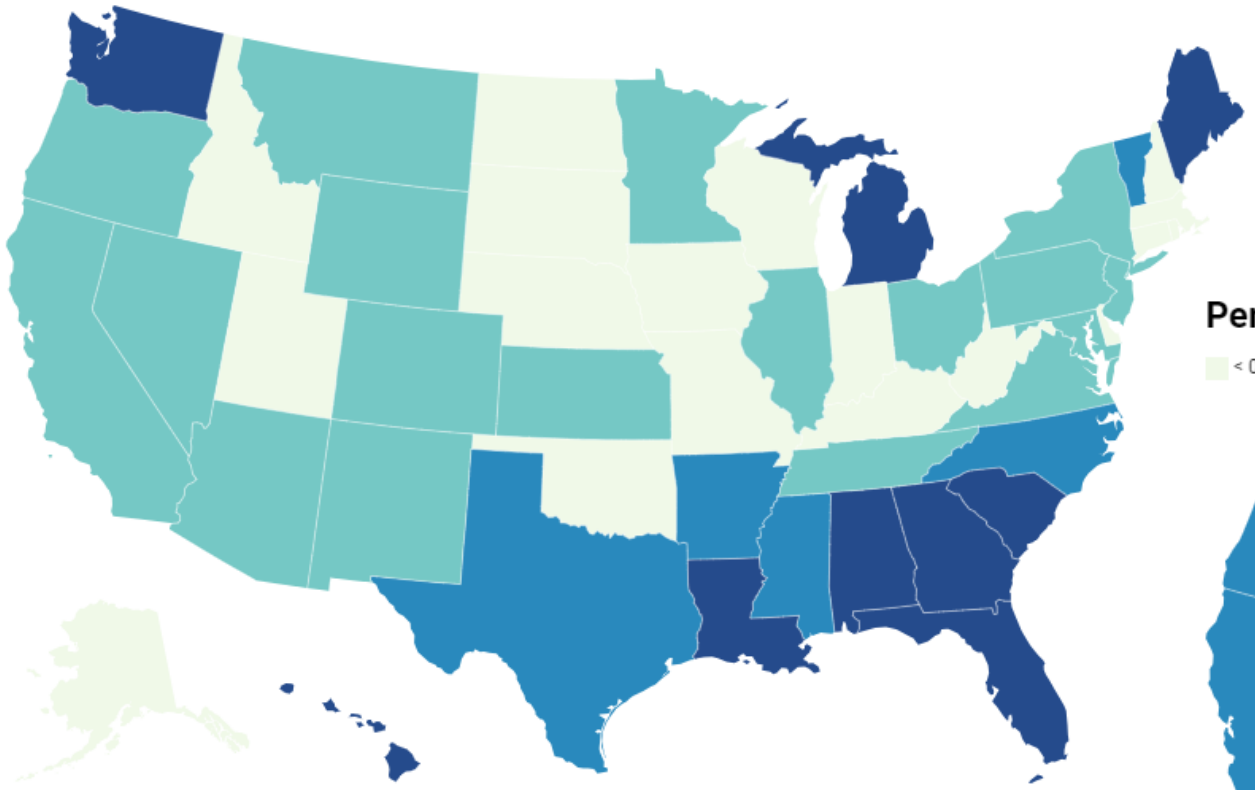
House Republicans Ask GAO to Probe Foreign Ownership of U.S. Farmland


Cumulative Foreign Interest in Ag Land:
Purchased vs Leased (mil. acres)
2000-2020
Million of Acres
50
40
30
20
10
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
acres_purchase
acres_lease


Cumulative Foregin Interest in US Cropland:
Purchased vs Leased 2000-2020
Million acres
12
10
8
6
4
2
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
crop_purchase
crop_lease

Percentage of Agricultural Land Foreign-Owned, 2009

< 0.4% 0.4%–1.6% 1.6%–2.4% ≥ 2.4%

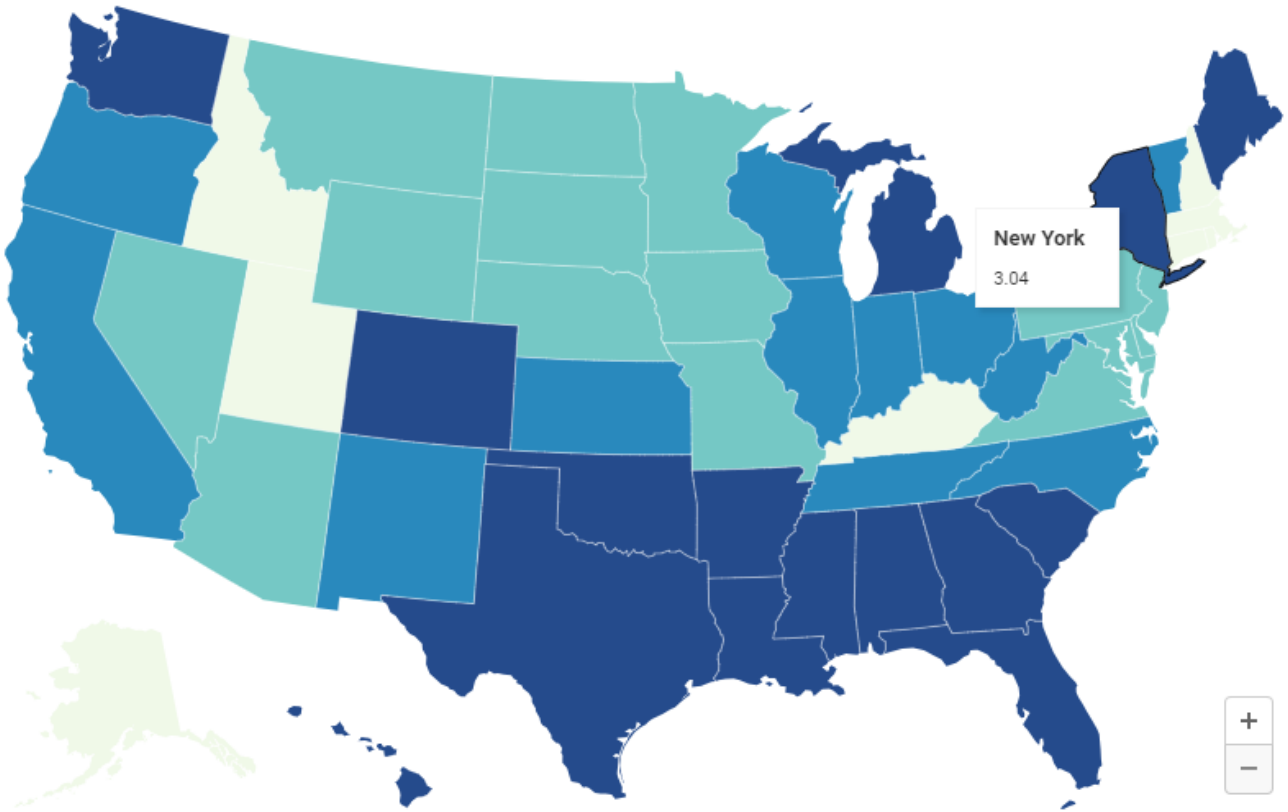


Methodology: Calculated by comparing 2009 Agricultural Foreign Investment Disclosure Act data with the total cropland, grassland pasture a forest-use land, and farmsteads, roads, and miscellaneous farmland private holdings listed in the 2007 Major Land Uses dataset by the Unite Department of Agriculture Economic Research Service.

Map: Cory Johnson, InvestigateTV • Created with Datawrapper

Percentage of Agricultural Land Foreign-Owned, 2019

< 0.4% 0.4%–1.6% 1.6%–2.4% ≥ 2.4%



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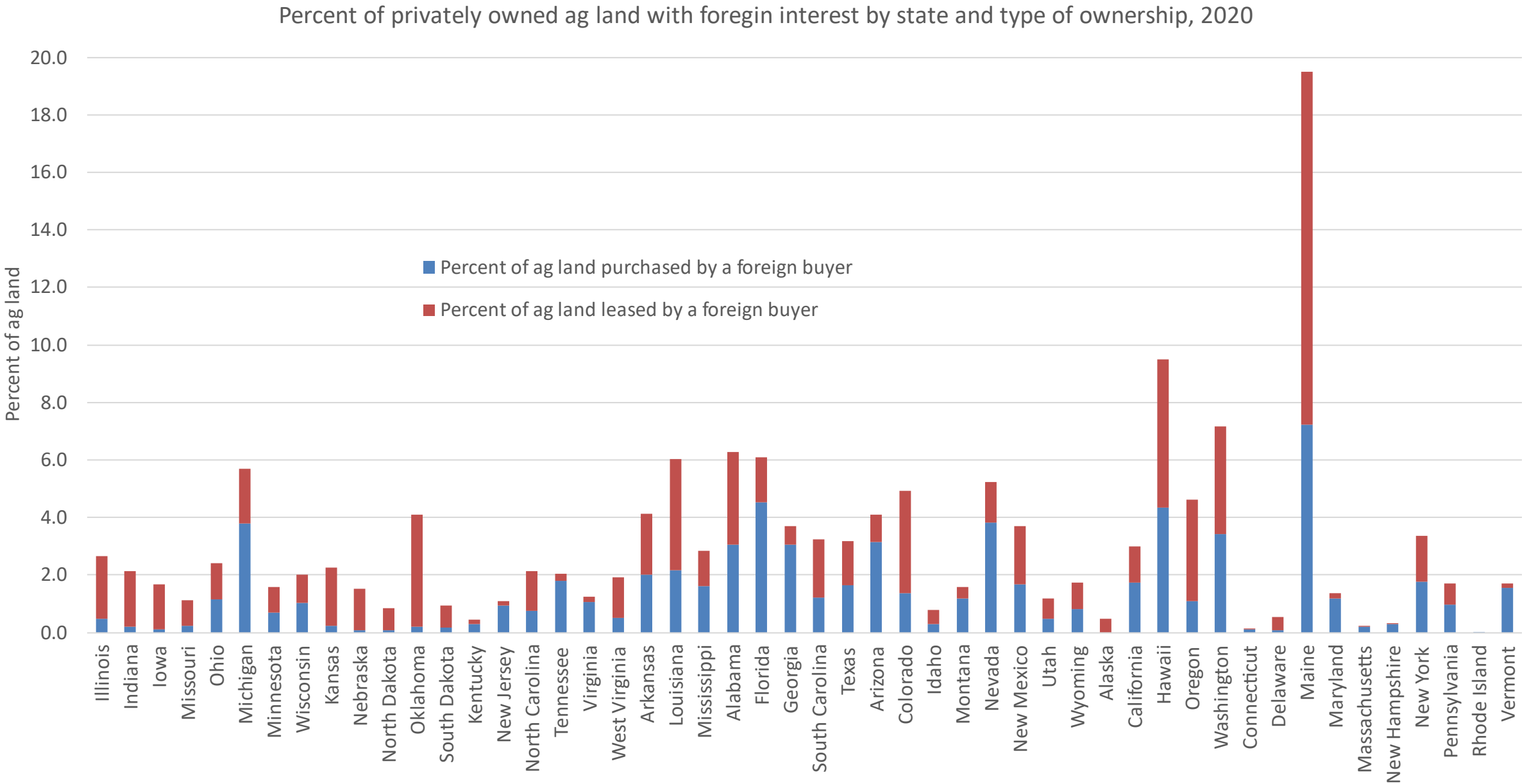
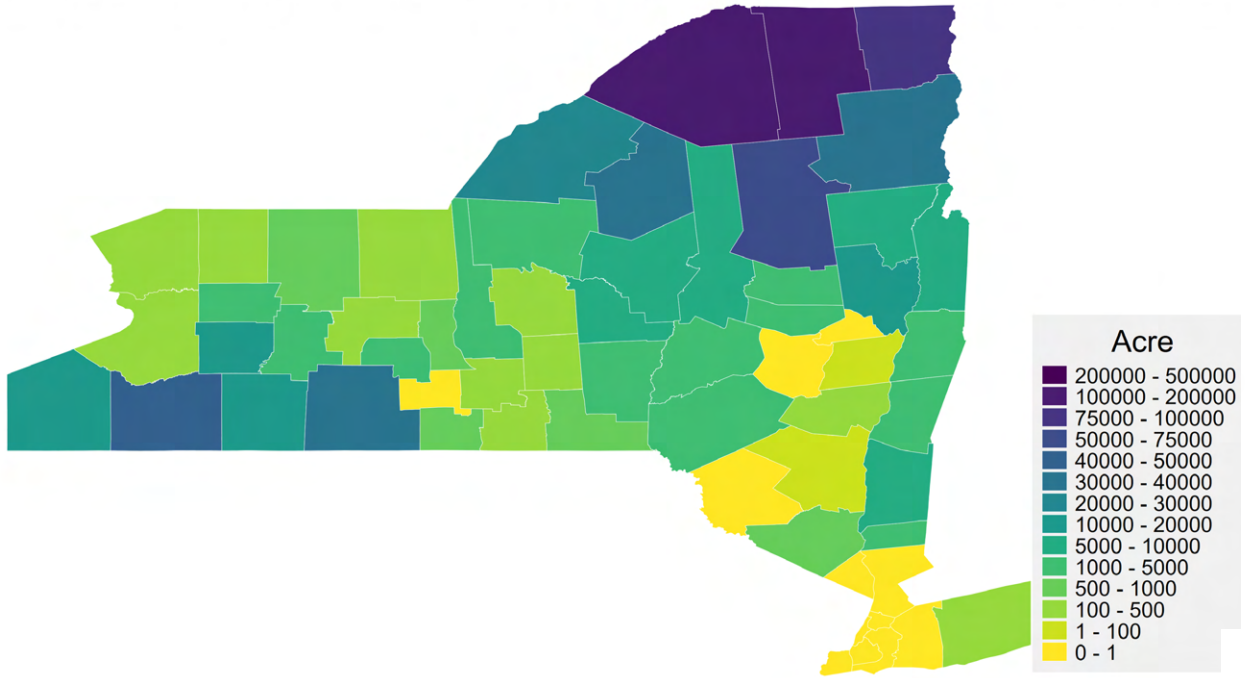
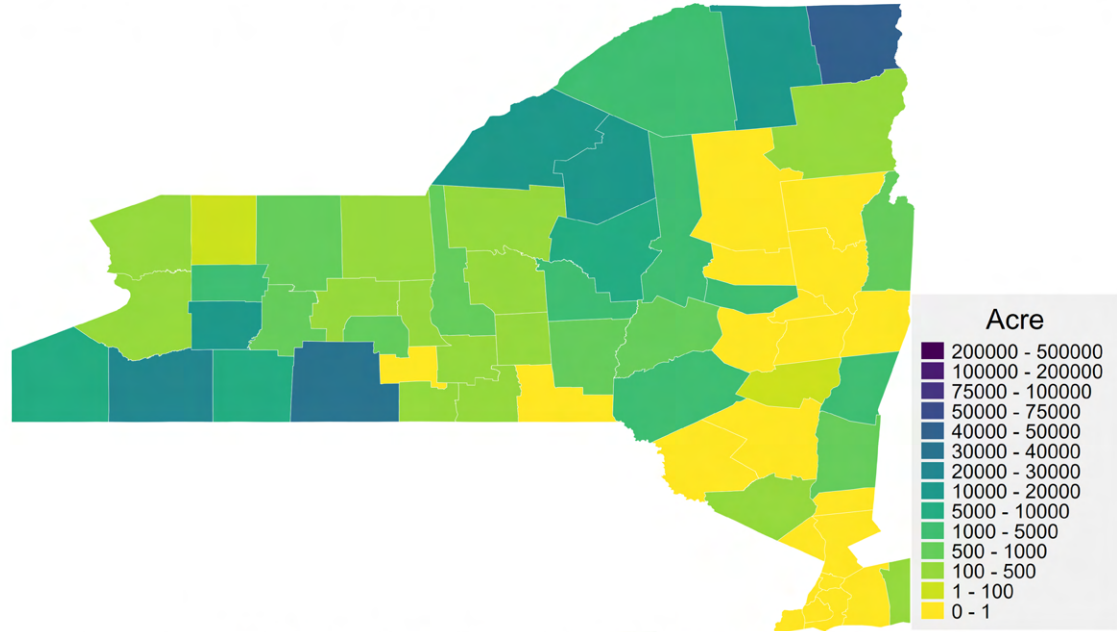

Percent of privately owned ag land with foregin interest by state and type of ownership, 2020
Percent of ag land
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Percent of ag land purchased by a foreign buyer
Percent of ag land leased by a foreign buyer
Illinois
Indiana
Iowa
Missouri
Ohio
Michigan
Minnesota
Wisconsin
Kansas
Nebraska
North Dakota
Oklahoma
South Dakota
Kentucky
New Jersey
North Carolina
Tennessee
Virginia
West Virginia
Arkansas
Louisiana
Mississippi
Alabama
Florida
Georgia
South Carolina
Texas
Arizona
Colorado
Idaho
Montana
Nevada
New Mexico
Utah
Wyoming
Alaska
California
Hawaii
Oregon
Washington
Connecticut
Delaware
Maine
Maryland
Massachusetts
New Hampshire
New York
Pennsylvania
Rhode Island
Vermont

Foreign ownership of NYS ag & non-ag land by all countries as of 2020

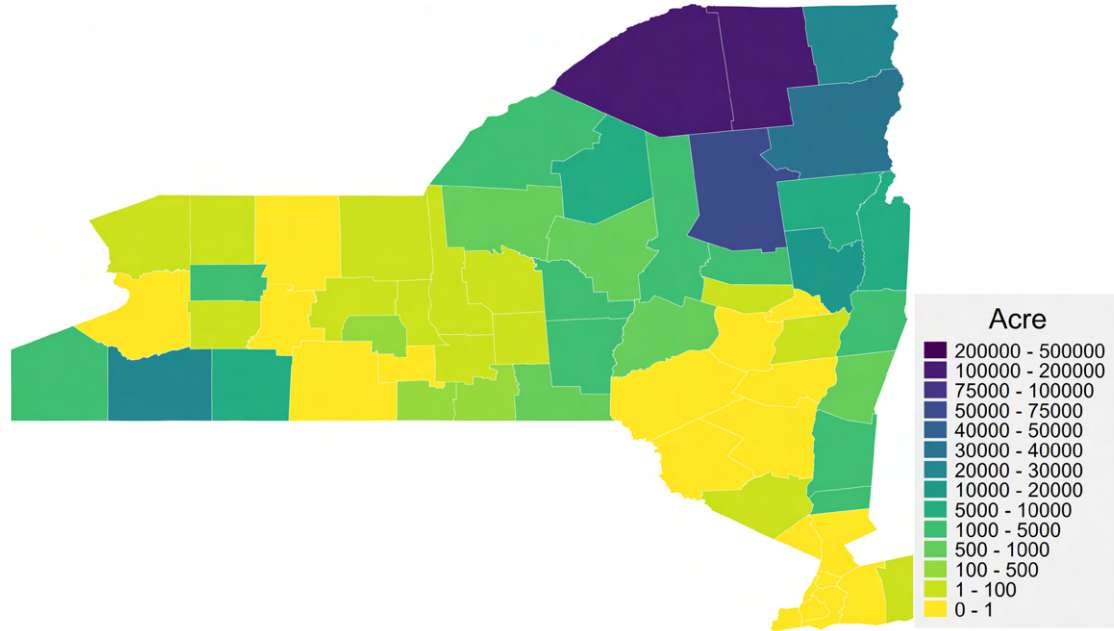


Source: AFIDA Database; Created by Wendong Zhang (Cornell) & Mykel Taylor (Auburn)

Foreign ownership of NYS cropland by all countries as of 2020

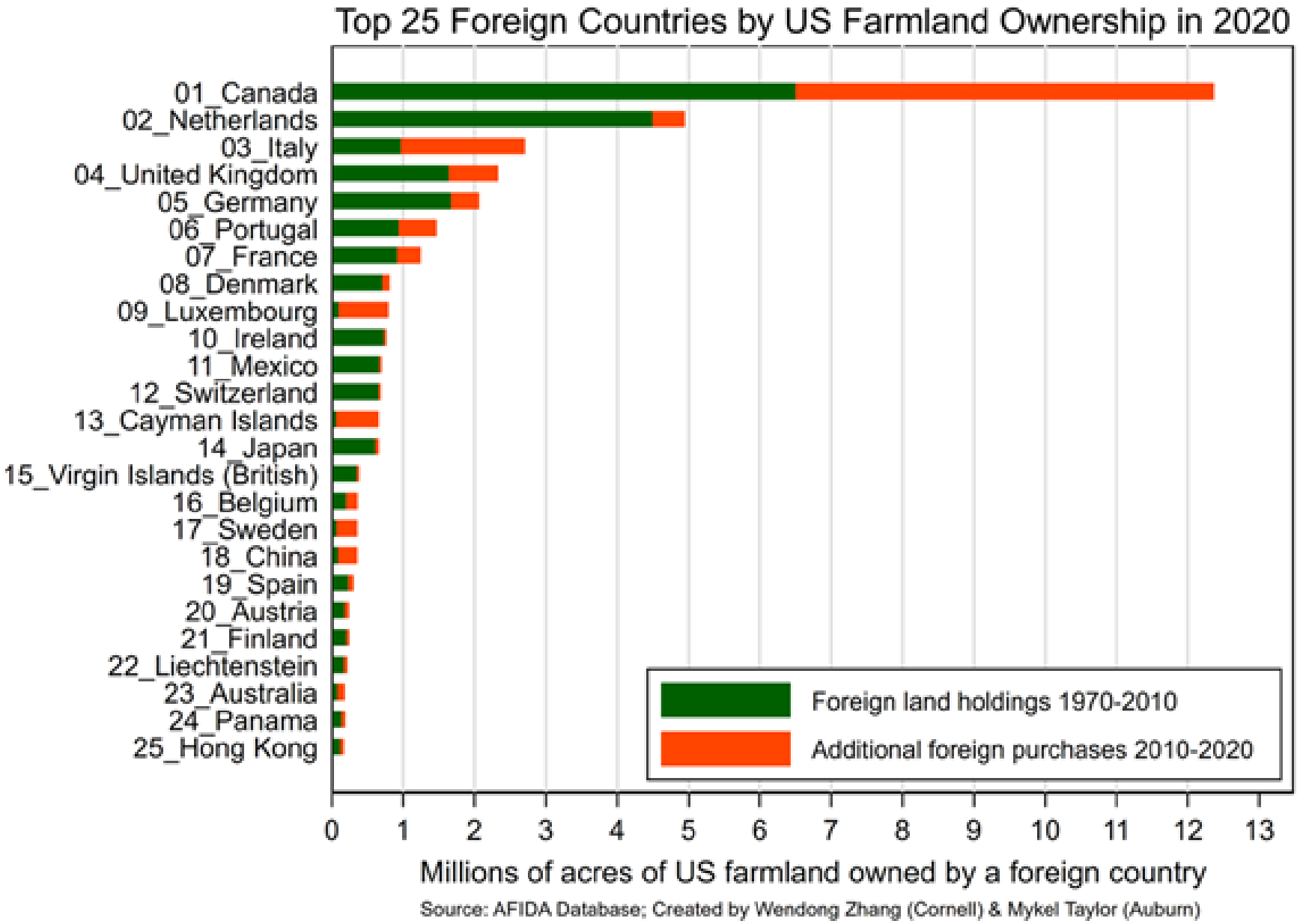


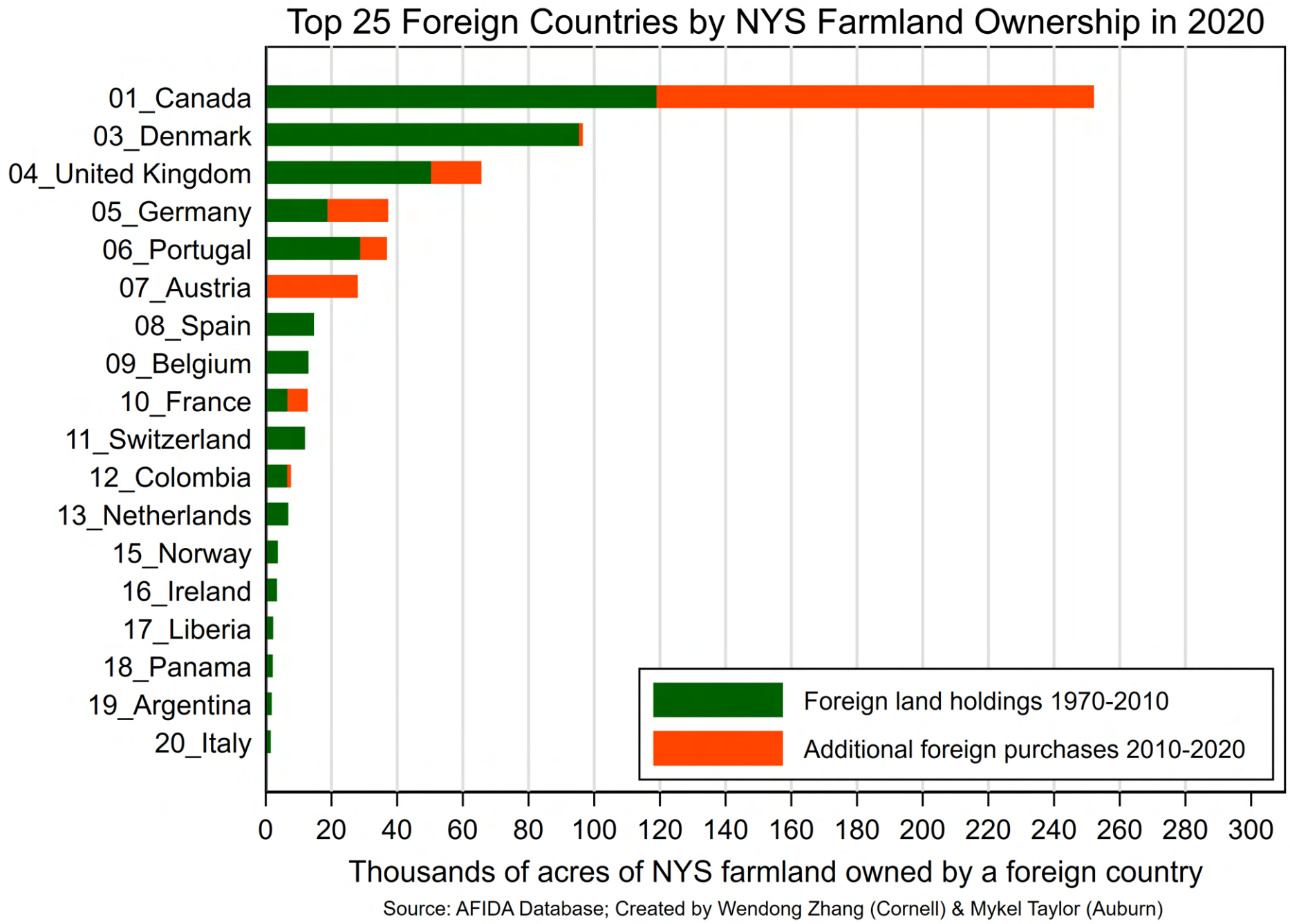
Foreign ownership of NYS forest land by all countries as of 2020



Source: AFIDA Database; Created by Wendong Zhang (Cornell) & Mykel Taylor (Auburn)

https://wendongzhang.weebly.com/afida.html


Top 25 Foreign Countries by US Farmland Ownership in 2020
01_Canada
02_Netherlands
03_Italy
04_United Kingdom
05_Germany
06_Portugal
07_France
08_Denmark
09_Luxembourg
10_Ireland
11_Mexico
12_Switzerland
13_Cayman Islands
14_Japan
15_Virgin Islands (British)
16_Belgium
17_Sweden
18_China
19_Spain
20_Austria
21_Finland
22_Liechtenstein
23_Australia
24_Panama
25_Hong Kong
Foreign land holdings 1970-2010
Additional foreign purchases 2010-2020
0
1
2
3
4
5
6
7
8
9
10
11
12
13
Millions of acres of US farmland owned by a foreign country
Source: AFIDA Database; Created by Wendong Zhang (Cornell) & Mykel Taylor (Auburn)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04_United Kingdom
05_Germany
06_Portugal
07_Austria
08_Spain
09_Belgium
10_France
11_Switzerland
12_Colombia
13_Netherlands
15_Norway
16_Ireland
17_Liberia
18_Panama
19_Argentina
20_Italy
Foreign land holdings 1970-2010
Additional foreign purchases 2010-2020
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Thousands of acres of NYS farmland owned by a foreign country
Source: AFIDA Database; Created by Wendong Zhang (Cornell) & Mykel Taylor (Auburn)

Energy & Farmland Markets

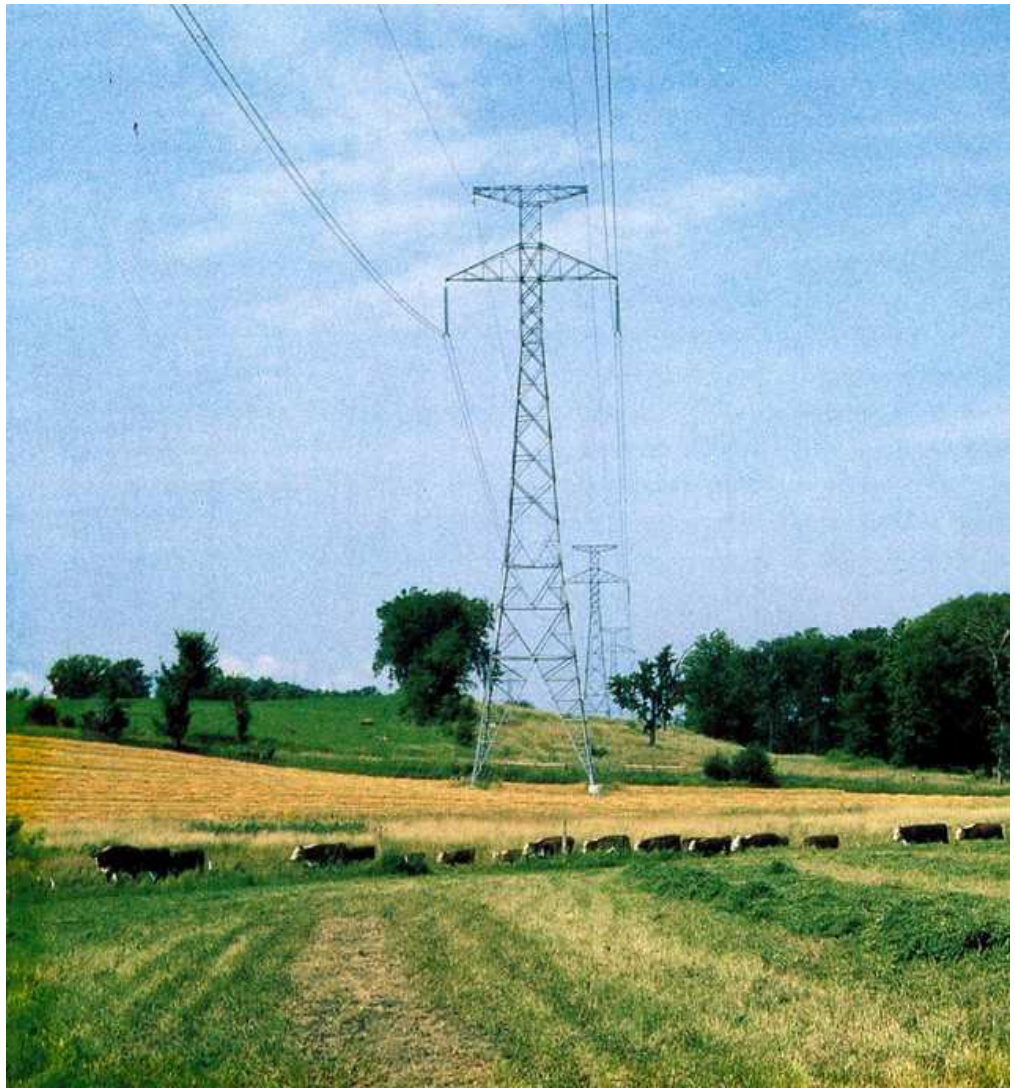
Electricity Transmission Lines & Farmland Values

TMLs and farmland values

- One paper found that the overhead TMLs depressed nearby farmland values in Italy (Sardaro et al., 2018)
- Some literature found that the TMLs does not find significant effects of TMLs on farmland values. (Brown, 1976; Jackson, 2010)
- A recent study shows that proximity to TMLs for farmland parcels could be positively valued AFTER construction of utility-scale solar facilities (Abashidze and Taylor, 2022)

TMLs and housing prices

- A bunch of literature has explored the adverse effects of electric transmission lines on housing property values due to:
  - Health risk and safety hazards (Priestley and Evans, 1990)
  - Visual aesthetics deterioration (Hamilton and Schwann, 1995; Des Rosiers, 2002; Chalmers, 2009)
  - Culture (Jackson, 2010)



Source: MINN Post (2020)
https://www.minnpost.com/mnopedia/2020/02/in-the-1970s-some-minnesota-farmers-were-very-upset-about-a-plan-to-route-power-lines-across-their-fields/

Source: Green Tech Media (2020)
https://www.greentechmedia.com/articles/read/midwest-grid-operators-seek-to-unlock-clean-energy-transmission-on-the-seam

Source: University of Nebraska-Lincoln (2017)
https://cropwatch.unl.edu/2017/look-avoid-power-line-deaths-harvest

Results: Baseline

	Farmland Values	
Dependent variable	log of price	
Sample	Pooled sample	
Distance to TMLs	-0.0099***	(0.0008)
Gross acres	-0.0565***	(0.0070)
Gross acres^2	0.0005***	(0.0002)
Land percentage tillable	0.2131***	(0.0127)
Average NCCPI for agriculture	0.8483***	(0.0306)
% of Prime farmland	0.0440**	(0.0180)
Soil texture: % of clay	0.3476***	(0.1016)
Soil texture: % of silt	-0.1447	(0.1183)
Soil texture: % of loam	-0.0193	(0.0178)
Average land slope	0.0025***	(0.0006)
Poppulation in Urban Areas	0.0070***	(0.0004)
Distance to highway	-0.1330***	(0.0118)
Distance to railway	-0.0583***	(0.0047)
Distance to waterbody	0.0905***	(0.0151)
Distance to biodiesel	-0.0184***	(0.0008)
Distance to Grain Warehouse	-0.0427***	(0.0035)
County FE	YES	
Year FE	YES	
No. of Observations	18580	
Adj. R-sq	0.423	

Premium: Farmland value decreases by 0.99% every one kilometer further away from the TMLs.

Disamenity: Housing price increases 1.21% every one kilometer away from the TMLs.

	House Prices	
Dependent variable	log of price	
Sample	Pooled sample	
Distance to TMLs	0.0121***	(0.0037)
Age	-0.0065***	(0.0007)
Age^2	0.0000*	(0.0000)
No. of stories	0.0569**	(0.0283)
No. of total rooms	0.0259***	(0.0035)
No. of total bedrooms	0.0139**	(0.0069)
No. of full bath	0.2443***	(0.0114)
Distance to hospital	-0.0055***	(0.0010)
Distance to school	0.0129***	(0.0022)
Distance to university	-0.0052***	(0.0007)
County FE	YES	
Year-Quarter FE	YES	
No. of Observations	919521	
Adj. R-sq	0.300	

Utility-Scale Solar Farms and Agricultural Land Values

Nino Abashidze and Laura O. Taylor

Published online before print December 29, 2022, 102920-0165R; DOI: https://doi.org/10.3368/le.99.3.102920-0165R

Abstract

Property value models are used to examine how utility-scale, ground-mount solar farms impact nearby agricultural land values. Results indicate that solar farms do not have direct positive or negative spillover effects on nearby agricultural land values. However, results also suggest that solar farm construction may indirectly affect agricultural land values by signaling the land's suitability for future solar development. Specifically, results indicate that proximity of agricultural land to electric transmission lines may be positively valued after a solar farm is constructed nearby.

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ABASHIDZE, NINO. Essays on Economic and Health Effects of Land Use Externalities. (Under the direction of Dr. Harrison Fell).

In the second essay of my dissertation, I link ground-level solar systems to housing prices in surrounding neighborhoods both in urban and rural areas. A novel, street network distance measure is utilized in the analysis to capture the visual externalities generated by solar farms. In a difference-in-differences-style framework, I explore the effect of the construction of a solar farm on houses in close proximity that are exposed to the externalities generated by a solar farm compared to houses located further away. The results provide evidence that the construction of a solar farm significantly decreases residential housing values for homes located less than one mile (measured via street network) from a farm and the effect is larger for houses located within a half-mile of a solar farm. The analysis also reveals that the construction of the solar farm reduces the number of house sales in close proximity. Interestingly, the results of stratified analysis indicate that the effect of solar farm construction is homogenous across communities.

Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island

Vasundhara Gaur and Corey Lang
Department of Environmental and Natural Resource Economics
University of Rhode Island

September 29, 2020

While utility-scale solar energy is important for reducing dependence on fossil fuels, solar arrays use significant amounts of land (about 5 acres per MW of capacity), and may create local land use disamenities. This paper seeks to quantify the externalities from nearby solar arrays using the hedonic method. We study the states of Massachusetts and Rhode Island, which have high population densities and ambitious renewable energy goals. **We observe over 400,000 transactions within three miles of a solar site**. Using a difference-in-differences, repeat sales identification strategy, **results suggest that houses within one mile depreciate 1.7% following construction of a solar array, which translates into an annual willingness to pay of $279. Additional results indicate that the negative externalities are primarily driven by solar developments on farm and forest lands in non-rural areas.** For these states, our findings indicate that the global benefits of solar energy in terms of abated carbon emissions are outweighed by the local disamenities.

Solar+saffron experiment could pave the path to more dual-use farms

By Billy Ludt | February 11, 2019

Saffron blooms underneath a solar panel in Vermont, its red stigma awaiting harvest. The University of Vermont and local solar developer Peck Solar are testing how the valuable spice will fare while paired with a solar array. University of Vermont

Saffron was planted in 12 test beds, made of three rows of four—the first in front of the solar array, second under the panels and third behind them. The spice made it through its first grow season in Vermont, and the test will finish after the next. Peck Solar

Cornell University

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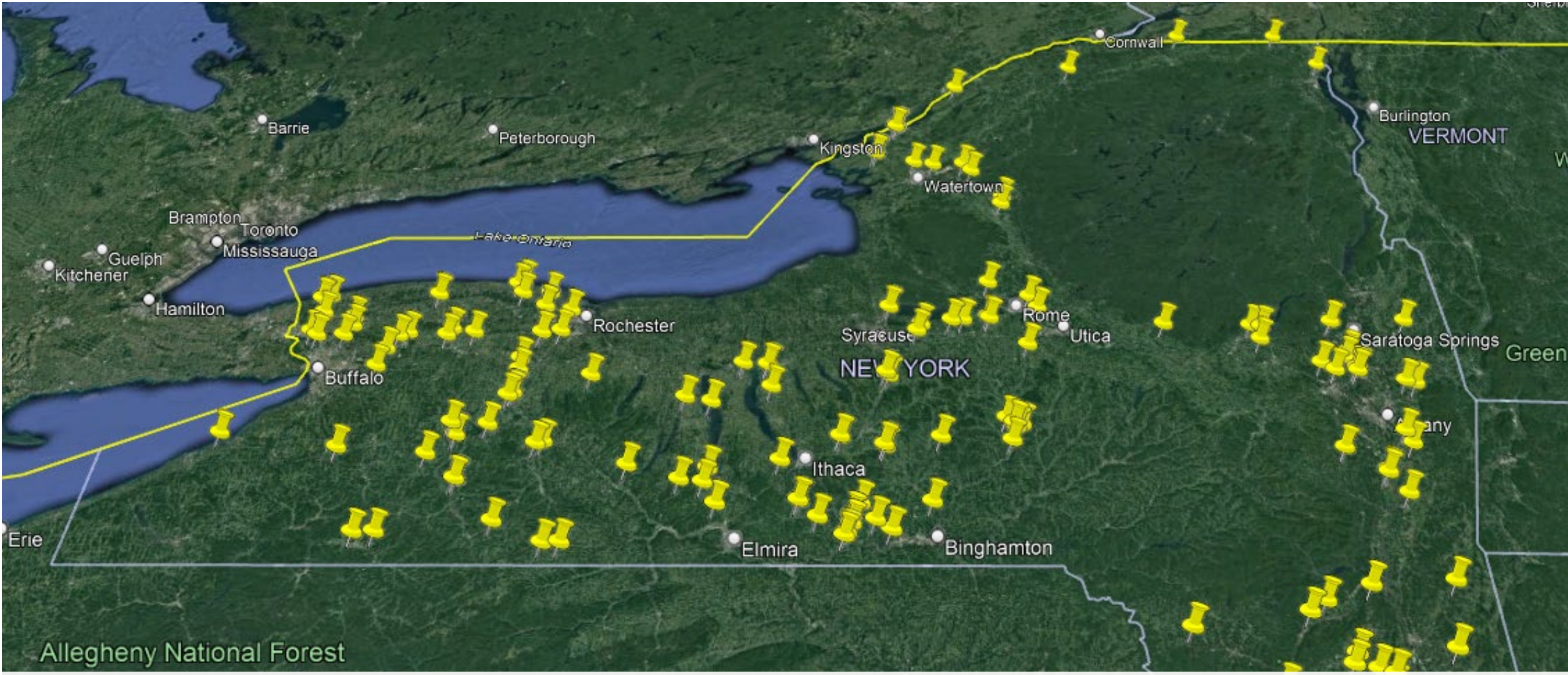
CCSS Grant Program for Cornell Faculty Members

Quantifying the Property Value and Land Use Impacts of Utility-Scale Solar Farms in New York State

Wendong Zhang, Assistant Professor, Applied Economics and Management
Richard Stedman, Professor, Natural Resources and the Environment
David Kay, Sr. Extension Associate, Global Development

Large solar facilities are critical to meet the New York State's ambitious climate and energy goals. This research will evaluate the monetary impacts of large solar farms on nearby farmland sales prices, and assess land use and crop choice changes following solar farm constructions using satellite data.



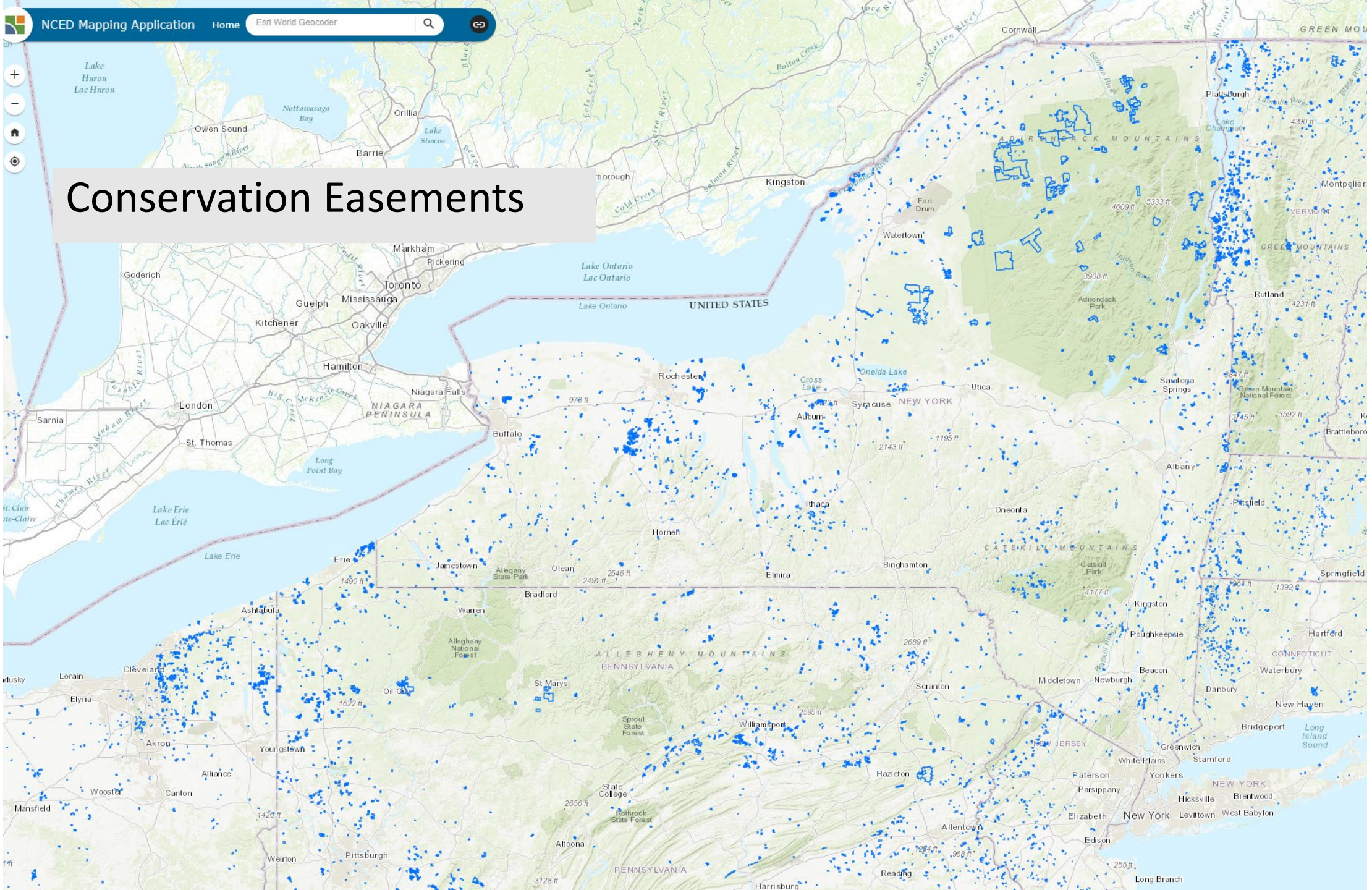
Utility-scale solar projects 5MW+

project_number	259339
street_address	1402 State Route 70
city	Hunt
county	Livingston
state	NY
zip_code	14846
incorporated_municipality	Portage
municipality_type	Town
census_tract	36051031200
sector	Non-Residential
program_type	Commercial/Industrial (MW Bl
solicitation	PON 3082
electric_utility	Rochester Gas and Electric
purchase_type	Power Purchase Agreement
date_application_received	2020-09-03T00:00:00.000
date_install	2021-12-28T00:00:00.000
project_status	Complete
contractor	Generate Capital

An example 7MW project in Livingston County completed in 2021

Top: 2018

Bottom: 2023


NCED Mapping Application
Home
Esri World Geocoder
Conservation Easements
Lake Huron
Lac Huron
Owen Sound
Barrie
Orillia
Kingston
Markham
Pickering
Goderich
Toronto
Guelph
Mississauga
Kitchener
Oakville
Hamilton
Lake Ontario
Lac Ontario
UNITED STATES
Niagara Falls
NIAGARA PENINSULA
London
Sarnia
St. Thomas
Buffalo
Rochester
Syracuse
NEW YORK
Utica
Oneida Lake
Albany
Lake Erie
Lac Érié
Erie
Jamestown
Allegany State Park
Olean
Bradford
Warren
Ashtabula
Elmira
Binghamton
Ithaca
Hornell
Oneonta
Cleveland
Lorain
Elyria
Akron
Youngstown
Alliance
Wooster
Canton
Mansfield
Oil City
St Marys
Sproul State Forest
Williamsport
Allegheny National Forest
ALLEGHENY MOUNTAINS
PENNSYLVANIA
Scranton
Middletown
Newburgh
Poughkeepsie
Kingston
Beacon
Danbury
Waterbury
Hartford
New Haven
Bridgeport
Long Island Sound
CONNECTICUT
Greenwich
Stamford
White Plains
Yonkers
Paterson
Parsippany
Hazleton
State College
Rothrock State Forest
Altoona
Pittsburgh
Weirton
Allentown
Reading
Harrisburg
Elizabeth
New York
Levittown
West Babylon
Hicksville
Brentwood
Edison
Long Branch
Montpelier
Plattsburgh
Watertown
Fort Drum
Adirondack Park
ADIRONDACK MOUNTAINS
VERMONT
GREEN MOUNTAINS
Rutland
Saratoga Springs
Green Mountain National Forest
Brattleboro
Springfield
Pittsfield
CATSKILL MOUNTAINS
Catskill Park
Cornwall

conservationeasement.us/eholderprofile/

Search for Easement Holder by Name

e.g. Ducks Unlimited (hit enter/return to execute search)

Easement Search | Interactive Map | Conservation Stories

NCED NATIONAL CONSERVATION EASEMENT DATABASE

County | **Filter by Year** (All)

All

- Conservation Easements in NYS

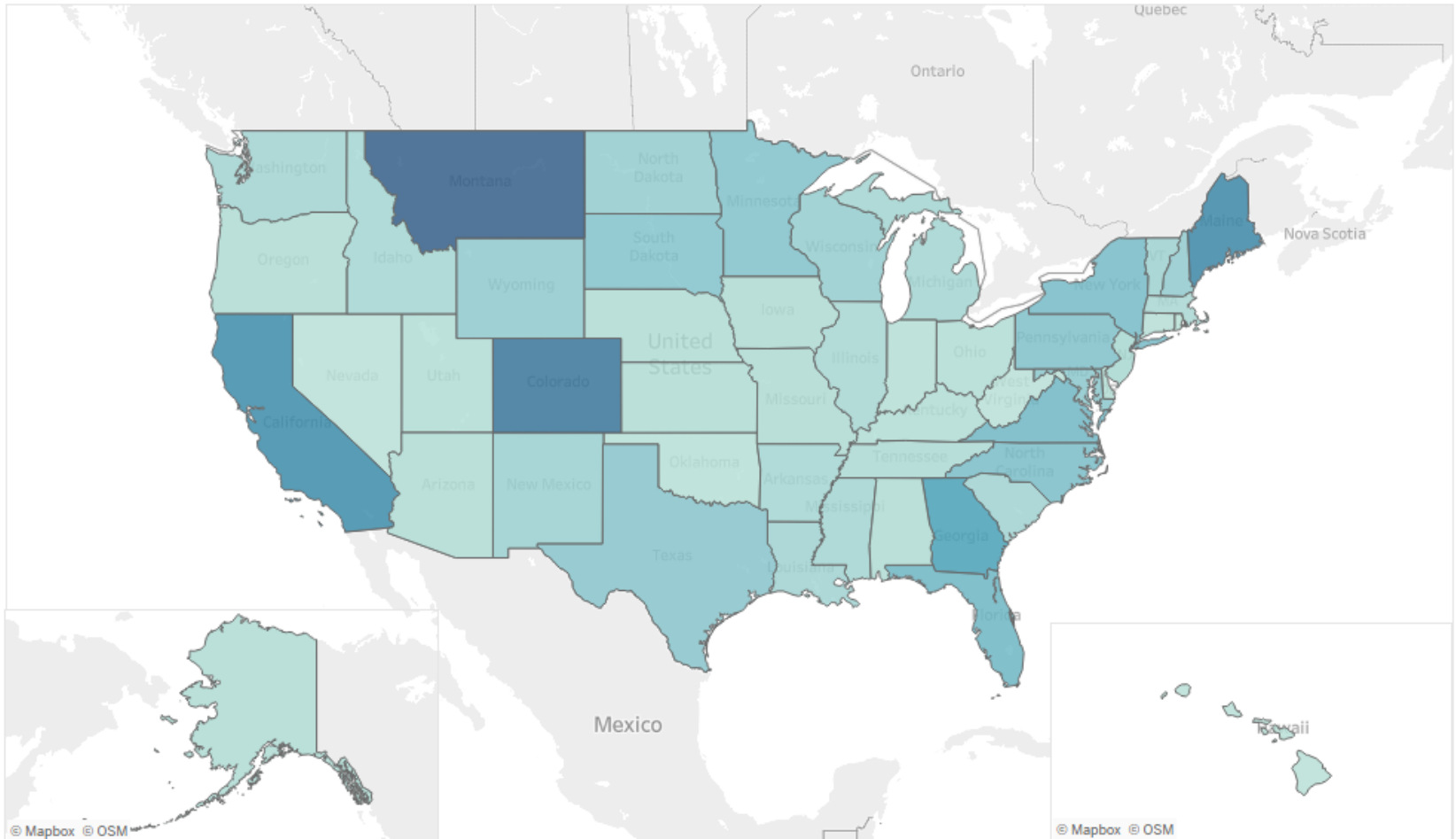
Total Acres
1,135,673

Number of Easements
4,597

Total Acres
33,527,688

Select a view: Acres choropleth by state

Number of Easements
201,525



Wrap Up

- Farmland values = local income / universal interest rate
- Income increasingly arise from urban development potential, energy development potential, and natural amenities
- New York State is an important ag state, but is an overlooked state with limited data on farmland value & rent
- Foreign land ownership, especially by China, is still very low in %, but an increasingly hot button political issue
- Owner-operators and individual non-operating landowners play a bigger role in New York State
- COVID-19 & inflation led to greater investor interest in farmland

Thank you!

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https://wendongzhang.weebly.com/

Dyson
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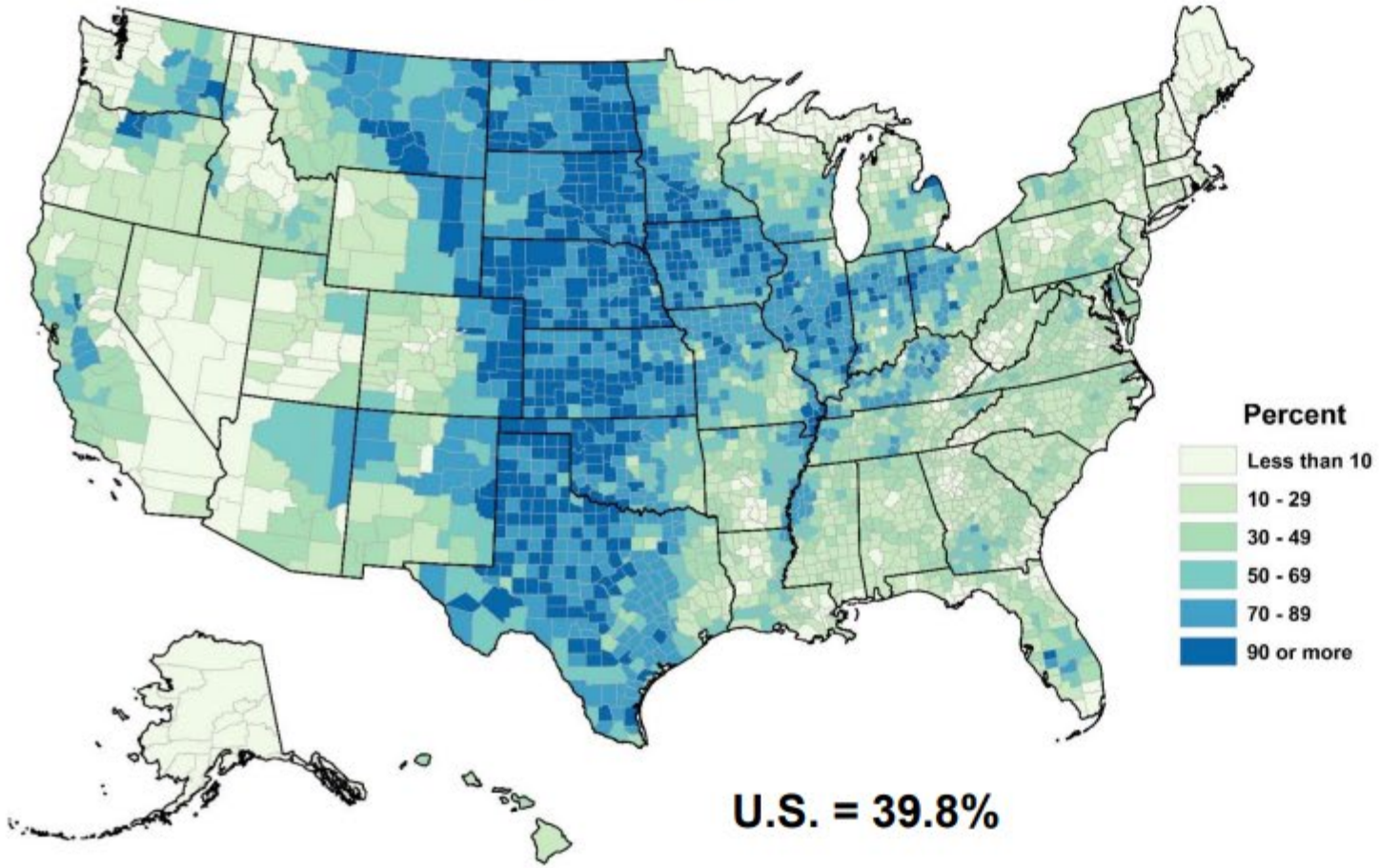
Land in Farms, 2017

As a Percent of Total, by County

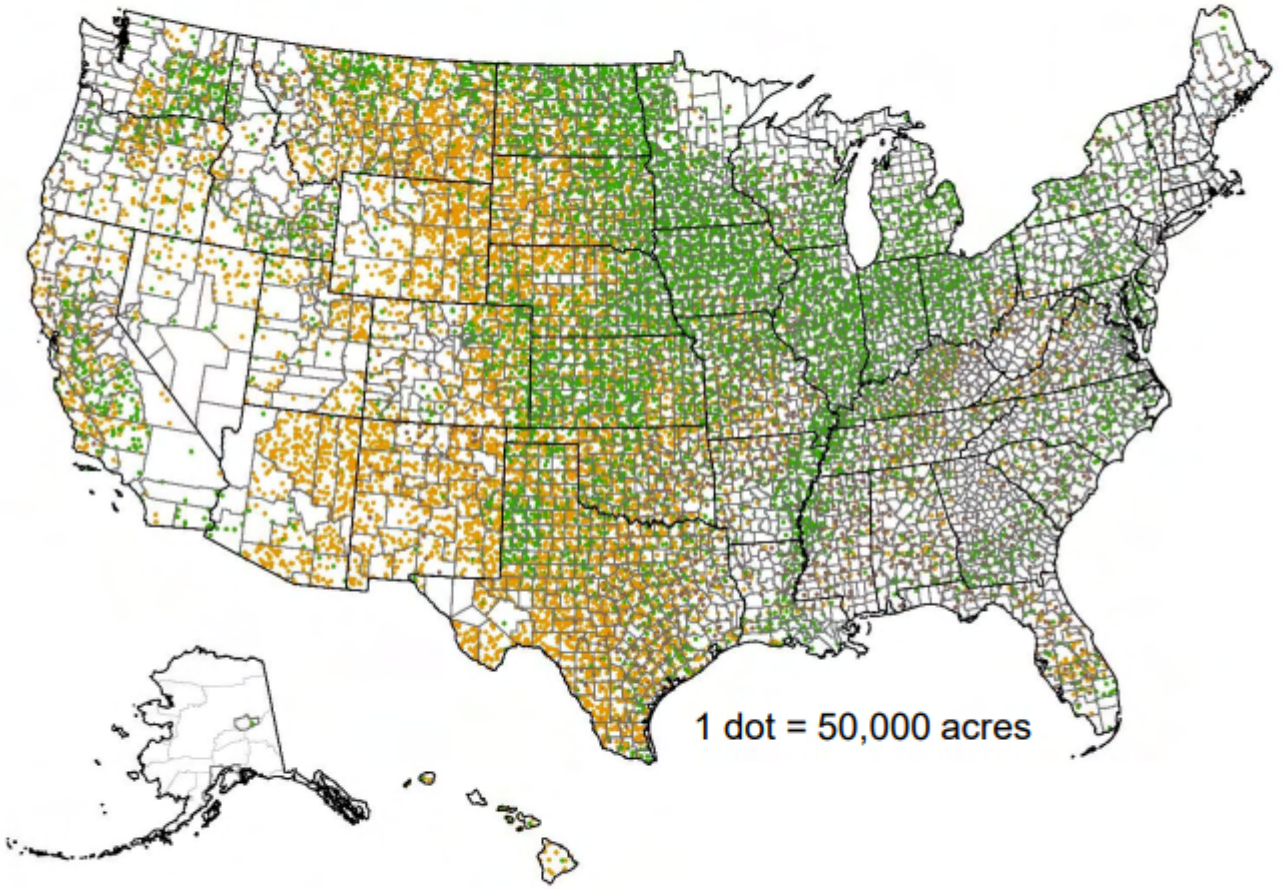


Type of Use	Acres (*millions*)
Total	900
Permanent Pasture	401
Cropland	396
Harvested Cropland	*320*
Woodland	73
Other*	30

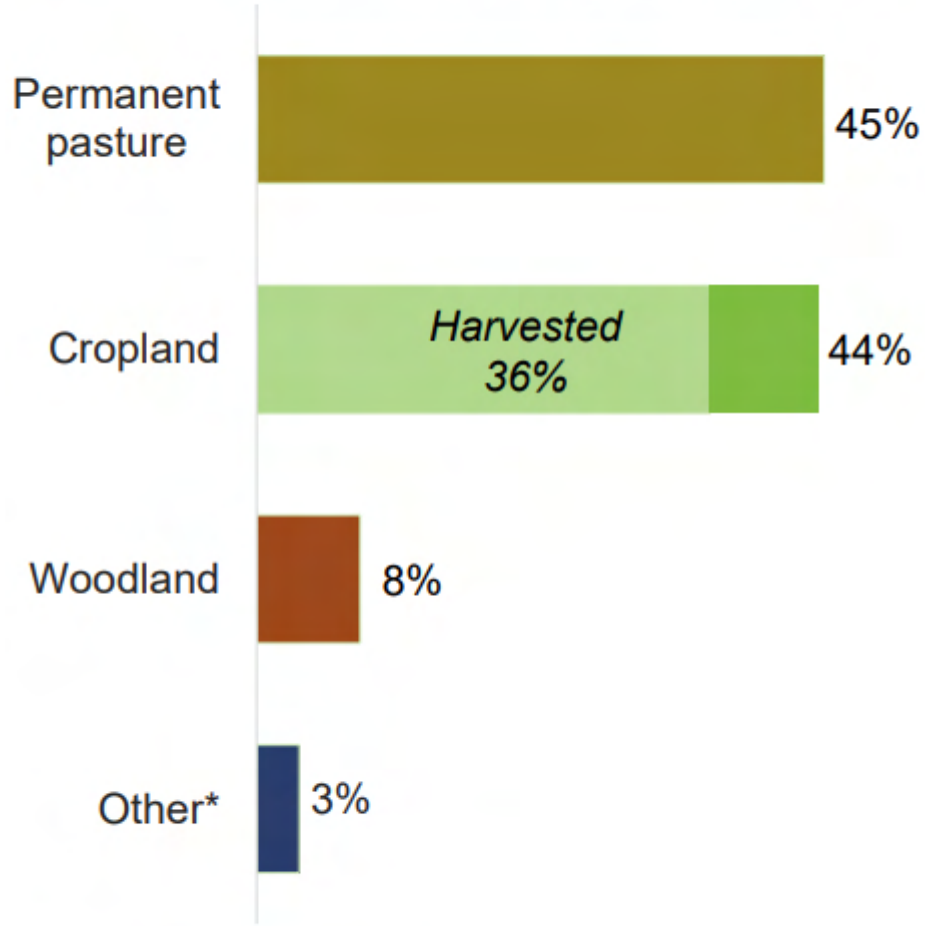
* Statistically significant difference from 2012

Land in Farms, 2017

Agricultural Land Use by Location



Land Use as Percent of Land in Farms



* Statistically significant difference from 2012