Trends, Issues and Opportunities for Northeast LGUs at the Rural-Urban Fringe

Prepared for the 2018 NERA/NEED Joint Summer Meeting

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NE RCRD

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Mega-Trends affecting rural areas, OECD 2018

- Population aging and migration
- Urbanization (agglomeration)
- Global shifts in production
- Rise of emerging economies
- Climate change and environmental pressures
- Technological breakthroughs (innovation)

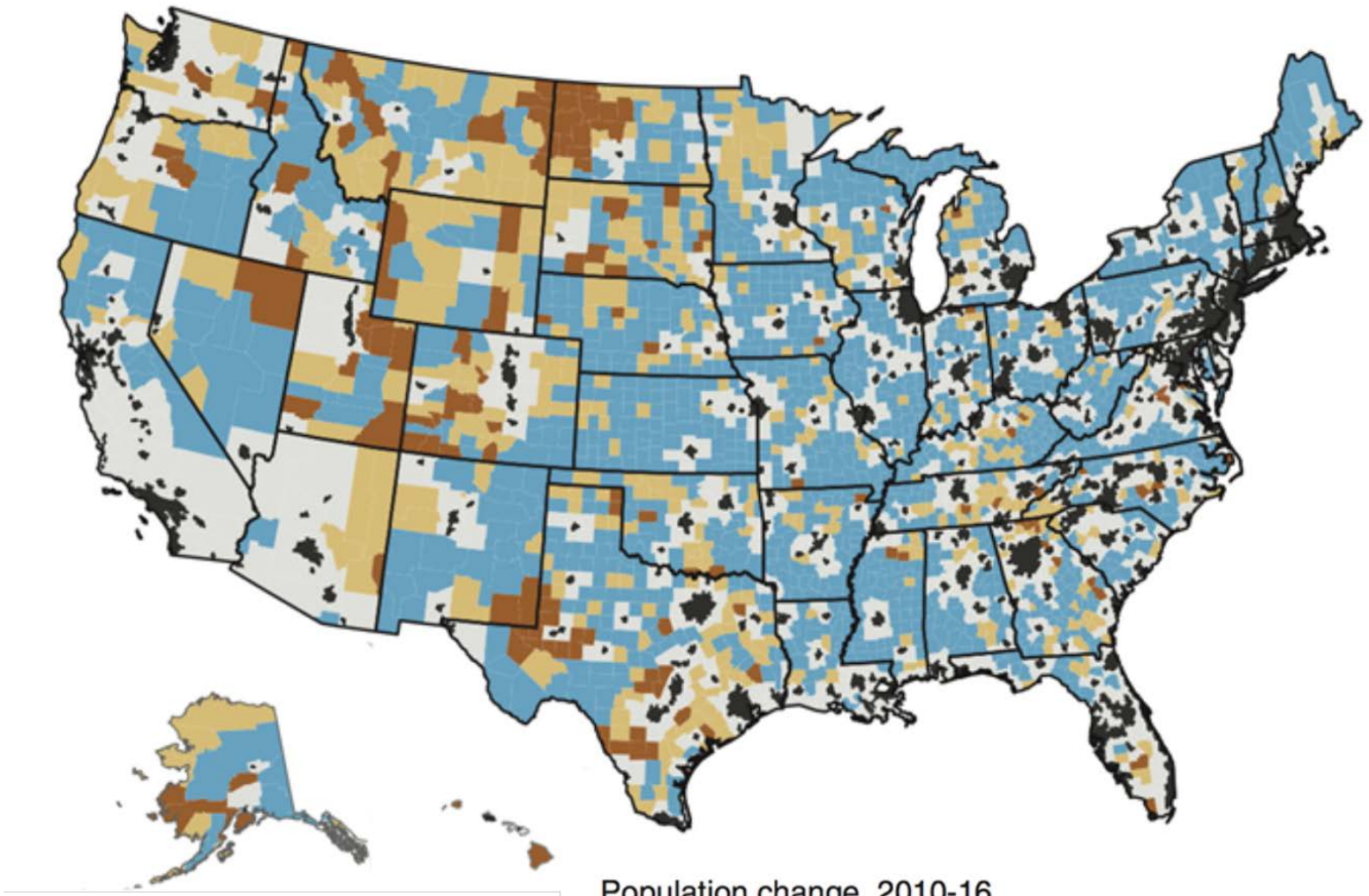
- Consumer tastes, preferences are changing

OECD: Organization for Economic Development and Cooperation (2018), *Rural 3.0: A Framework for Rural Development,* and Author

Population aging and migration

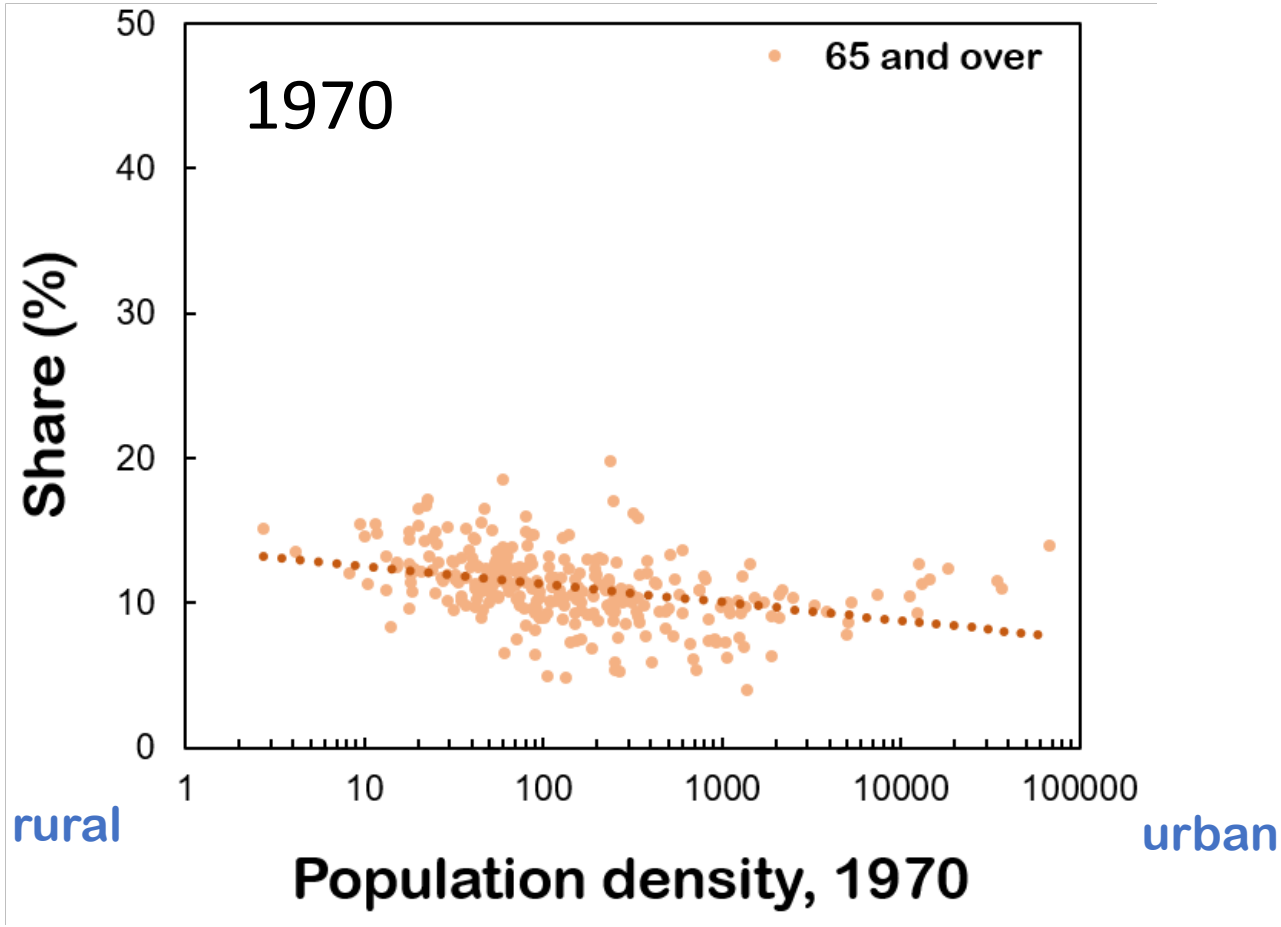
(Out) migration: Non-metro population loss is now widespread in the Eastern U.S.

- Rural workers drawn into cities: push and pull factors
- Leaves behind an aging population



Source: USDA Economic Research Service using data from the U.S Census Bureau.

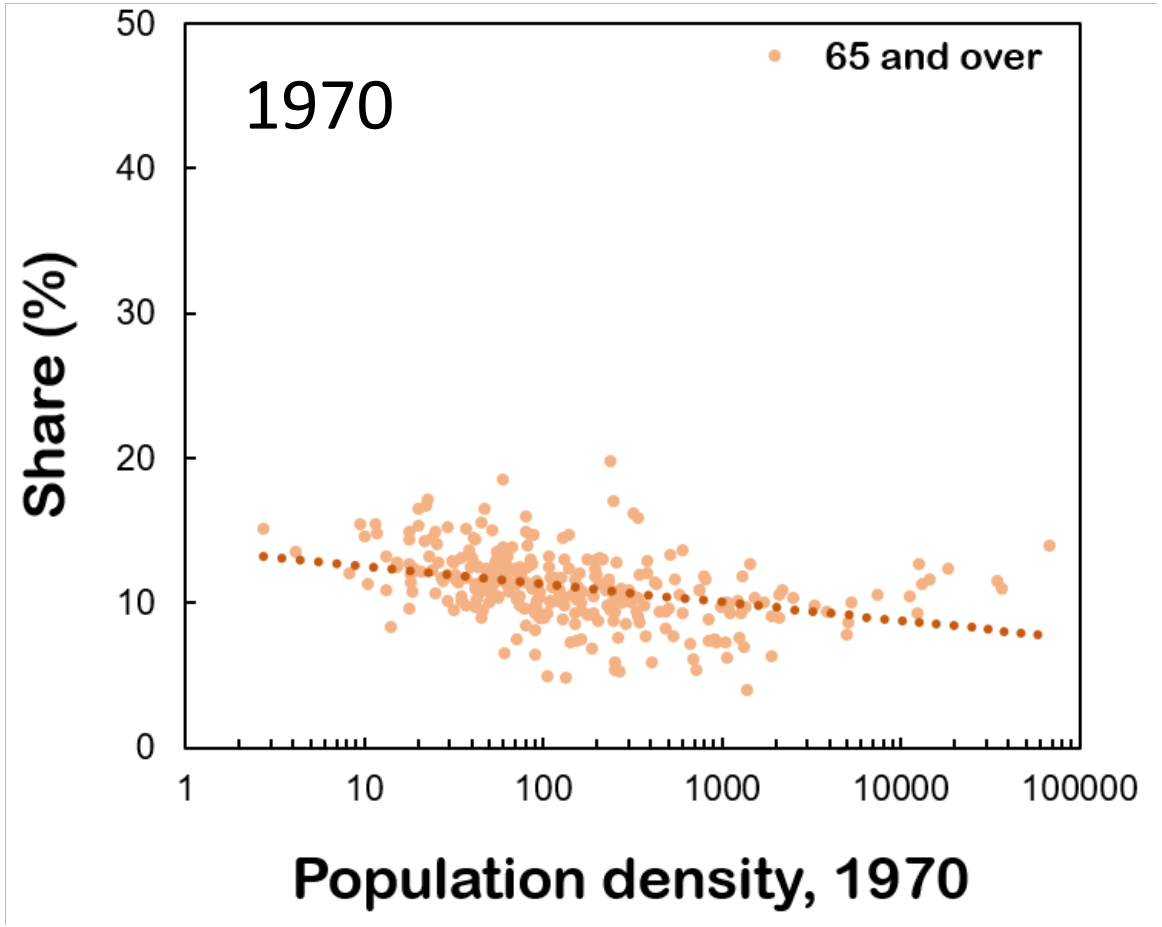
Age cohorts vs. pop density, NE counties

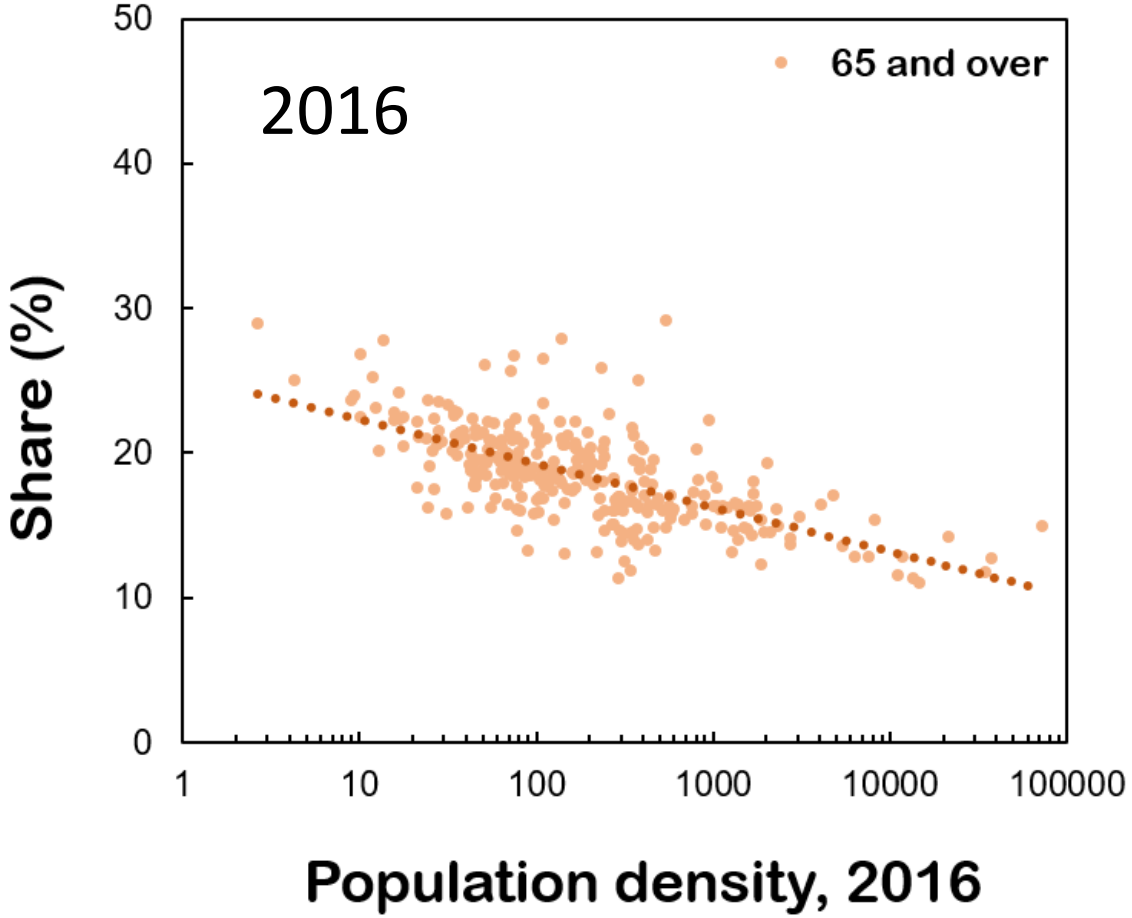


	R^2	*t*	*beta*
65 and over	0.1324	-5.80	-0.3638

Data source: U.S. Census, Population and Housing Unit Estimates

Age cohorts vs. pop density, NE counties





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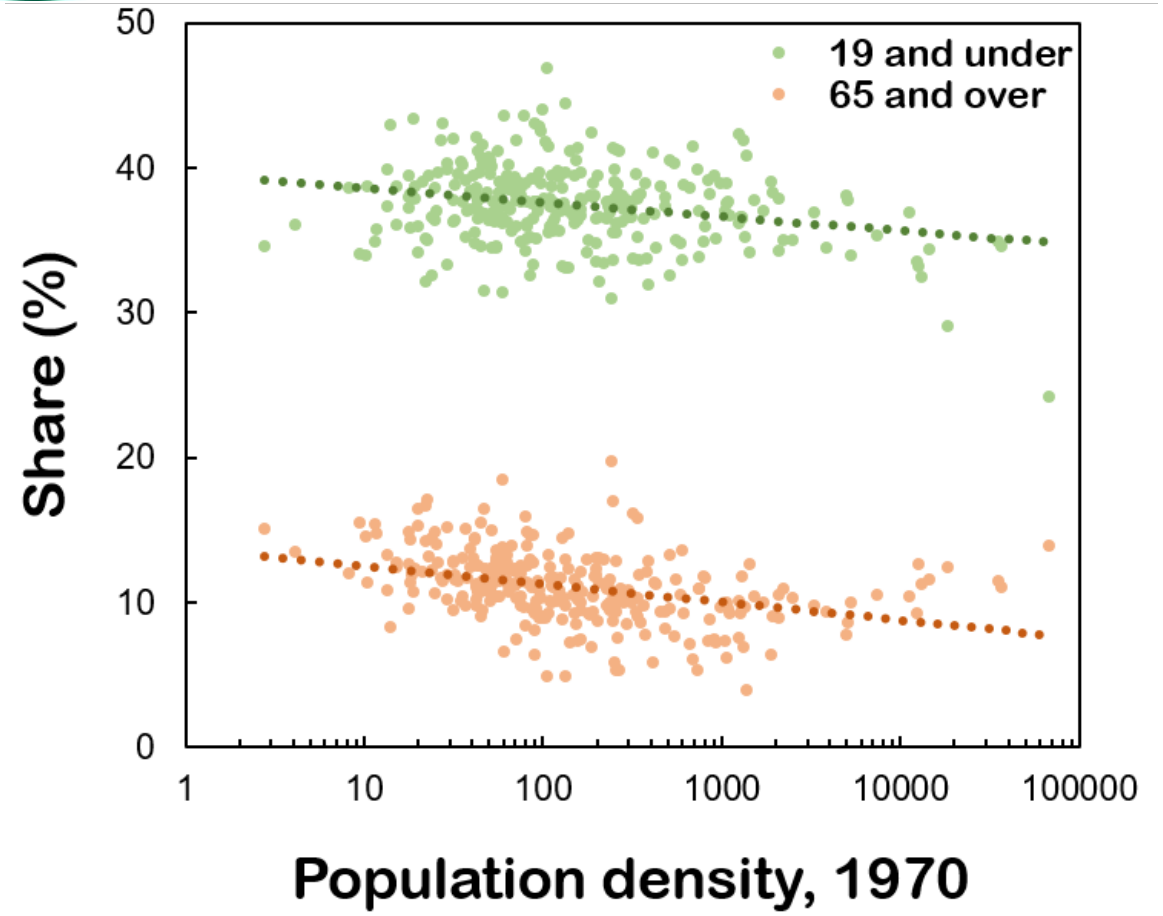

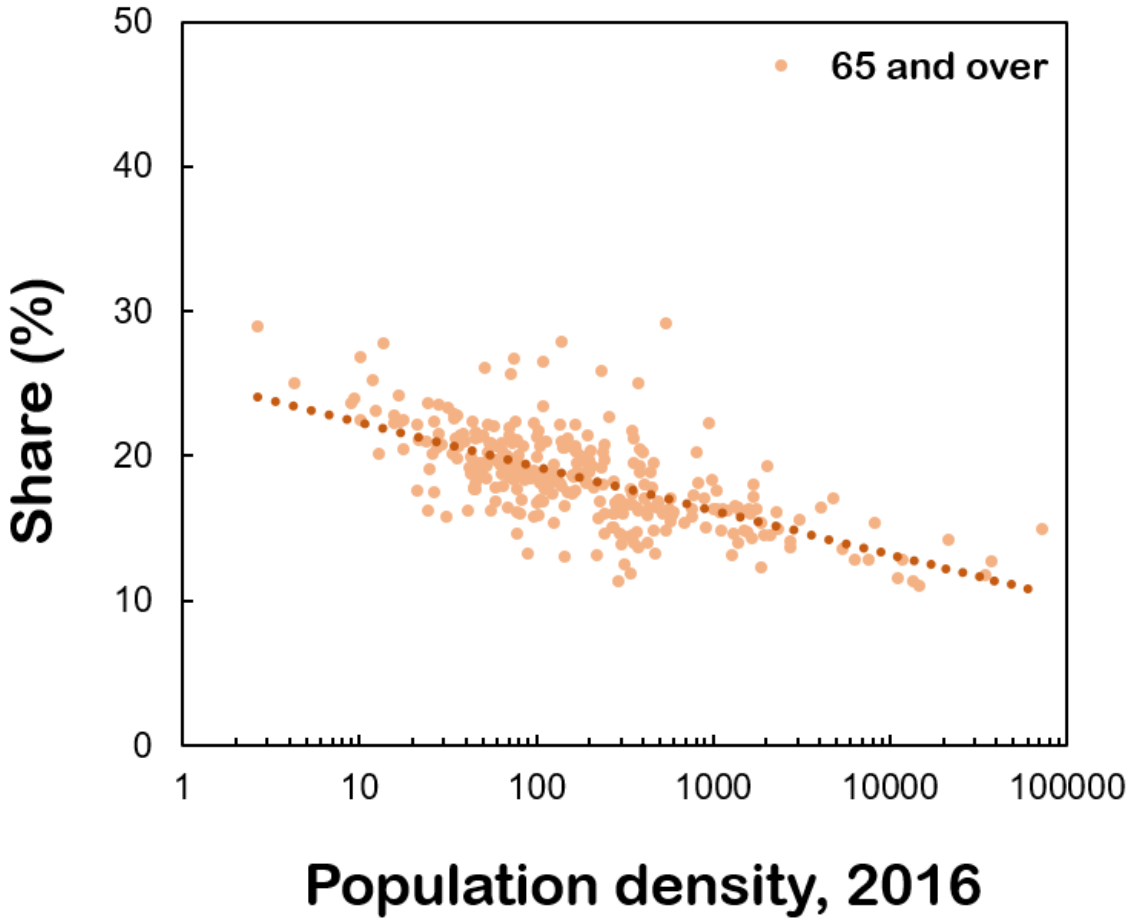

	R^2	*t*	*beta*
19 and under	0.0619	-3.41	-0.2487
65 and over	0.1324	-5.80	-0.3638

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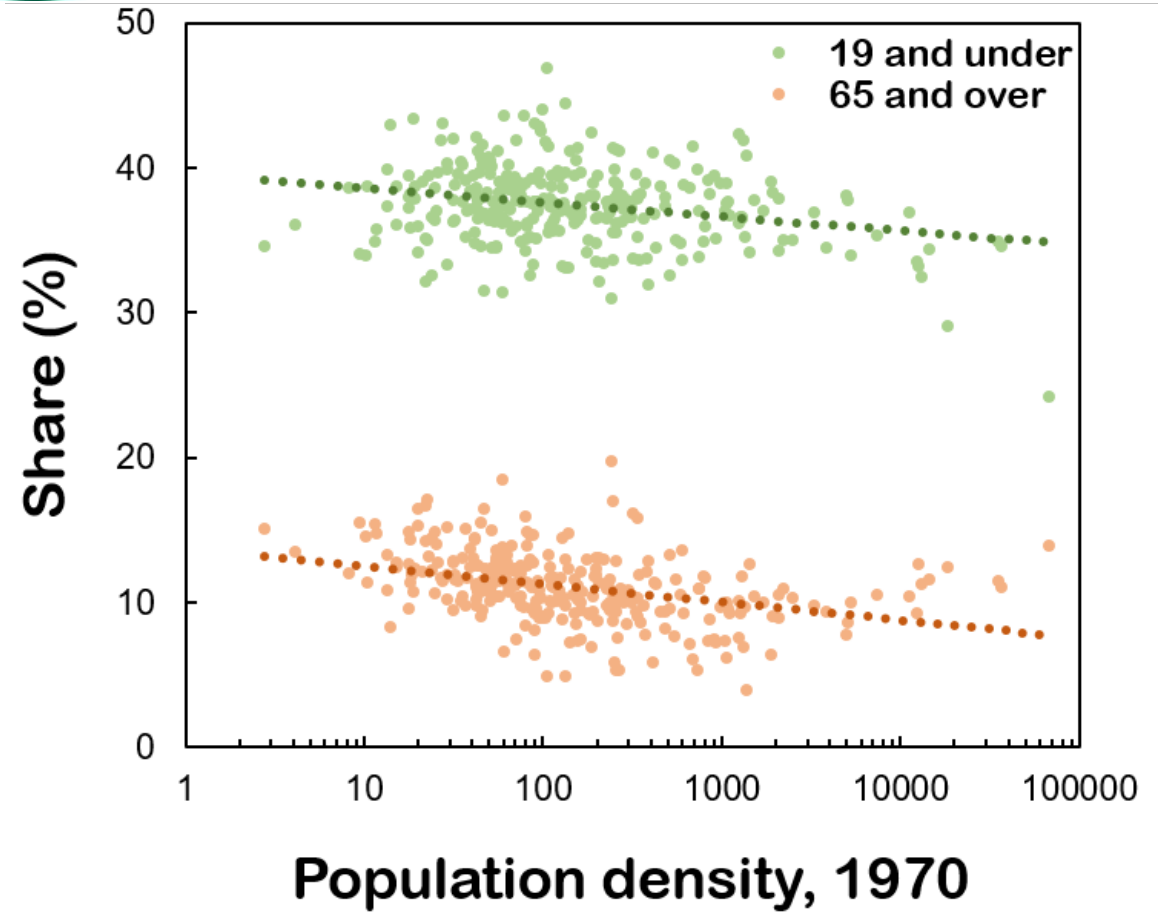

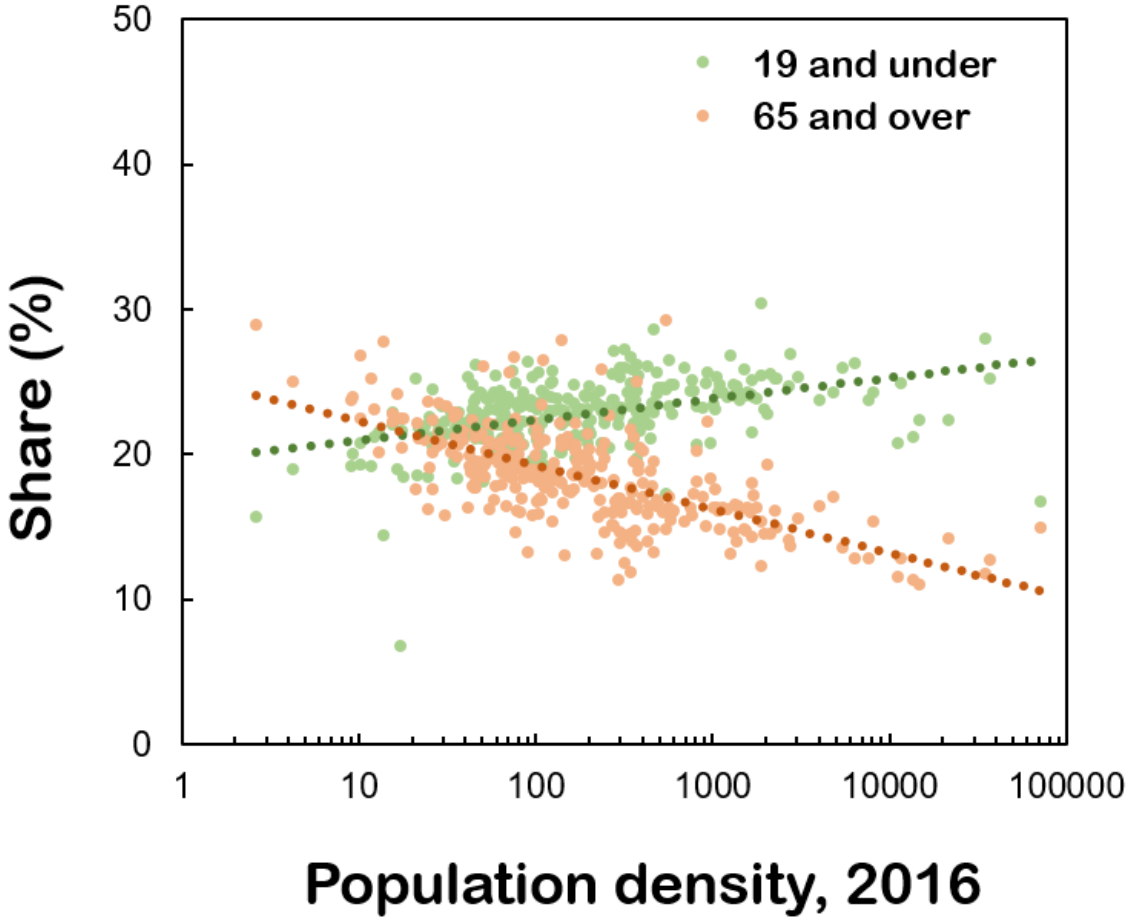

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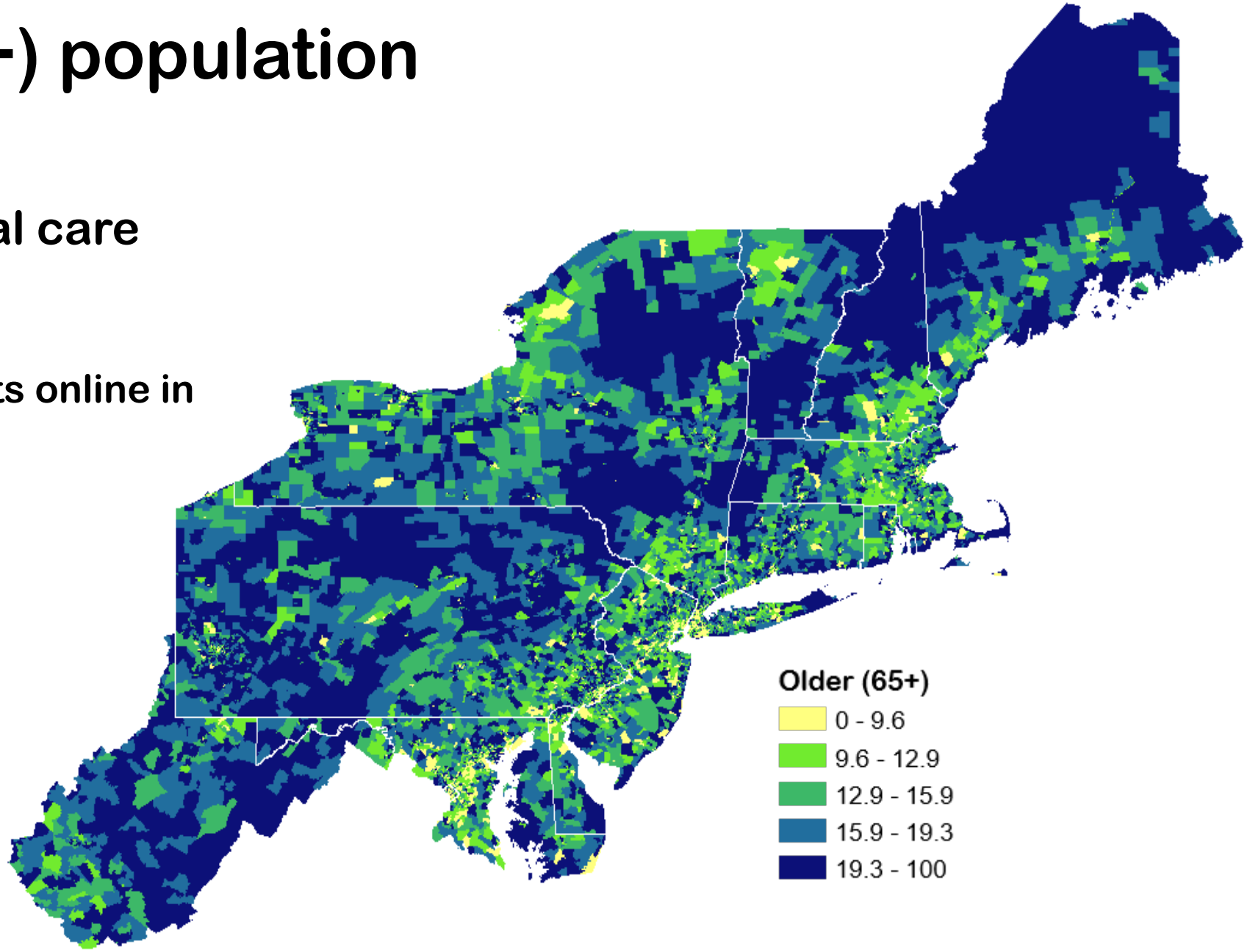
	R^2	*t*	*beta*
19 and under	0.1930	5.49	0.4393
65 and over	0.4324	-16.62	-0.6576

Data source: U.S. Census, Population and Housing Unit Estimates

Older (65+) population

- Who will provide medical care
  - Robots as care givers?
  - Medicines via drones
  - 50% of primary care visits online in California
- FCS, intergenerational programs
  - M. Kaplan PSU



Data source: U.S. Census, American Community Survey, 2012-2016

Urbanization and agglomeration

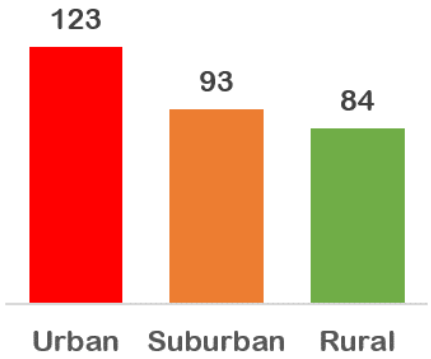
Urbanization (and agglomeration)

- Over half of world population now lives in cities (55%)
  - 2050: it will be two-thirds (68%)[1]
- Driven by agglomeration economies (push/pull factors)
  - Better matching in job, marriage markets
- More opportunity for innovation from spillovers
  - Rate of patent citations declines with distance

- Political power shifting away from rural areas
  - Rural discontent → need new frameworks, inclusion mechanisms

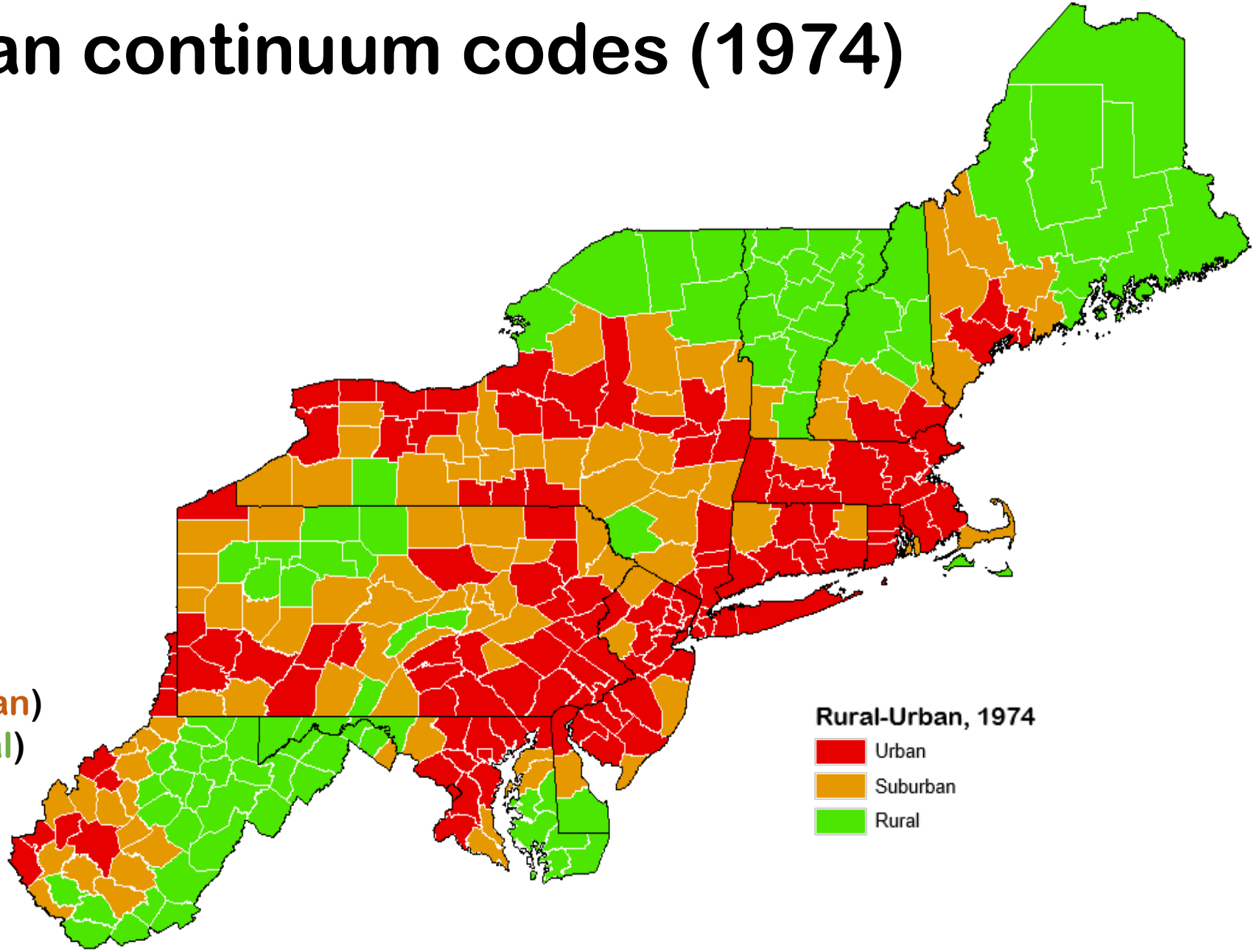
[1]UN Dept. Economic and Social Affairs (2018)

Rural-urban continuum codes (1974)



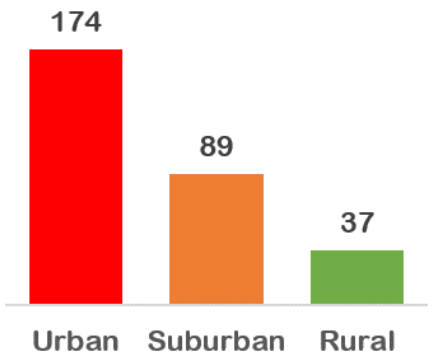
Classification based on OMB

Metro (urban)
Non-metro
- **Adjacent to metro (suburban)**
- **Not adjacent to metro (rural)**

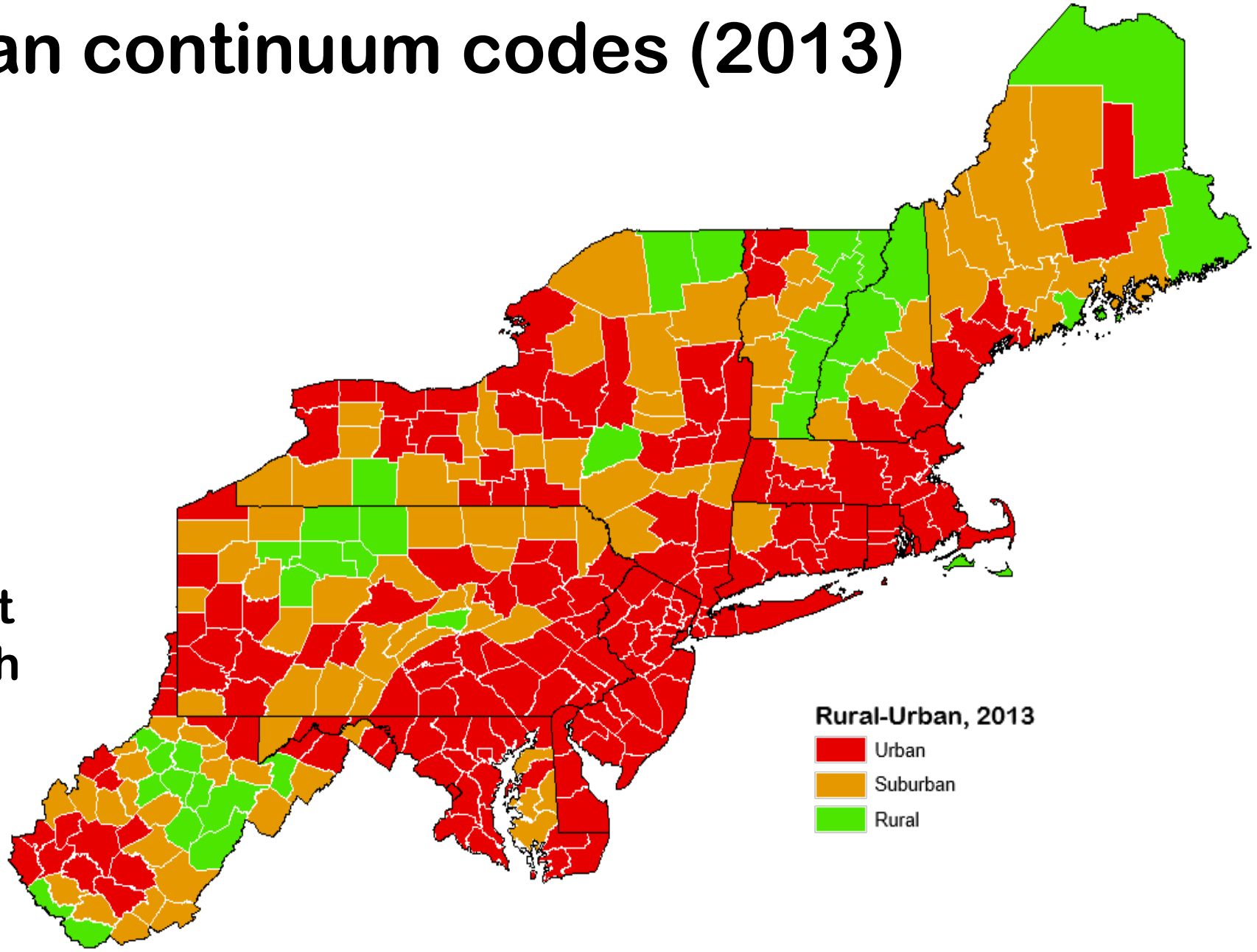


Data source: USDA ERS, Rural-Urban Continuum Codes, 1974

Rural-urban continuum codes (2013)



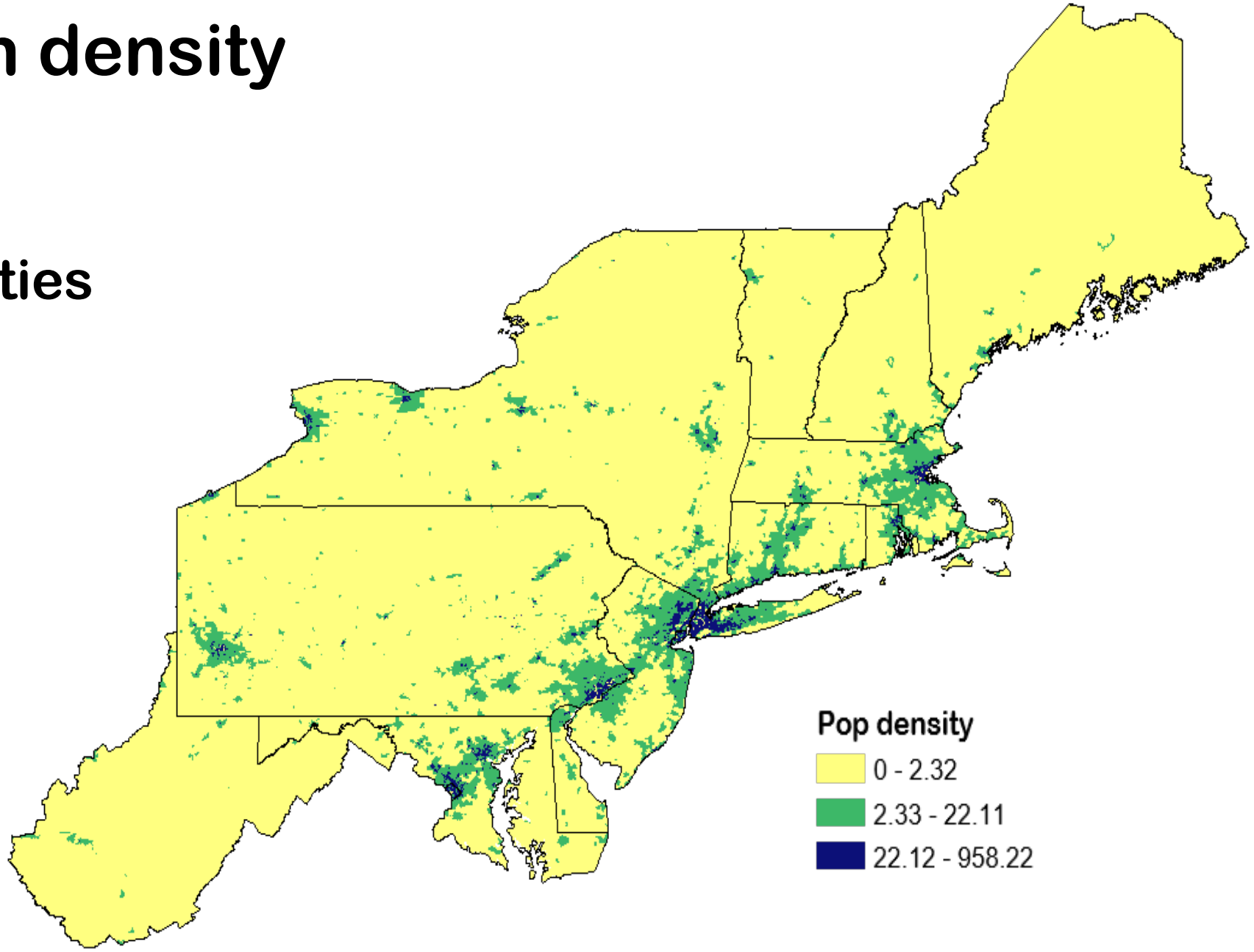
People in suburbs report fewer poor mental health days on average (Goetz et al. 2015, in *Social Indicators Research*)



Data source: USDA ERS, Rural-Urban Continuum Codes, 2013

Population density

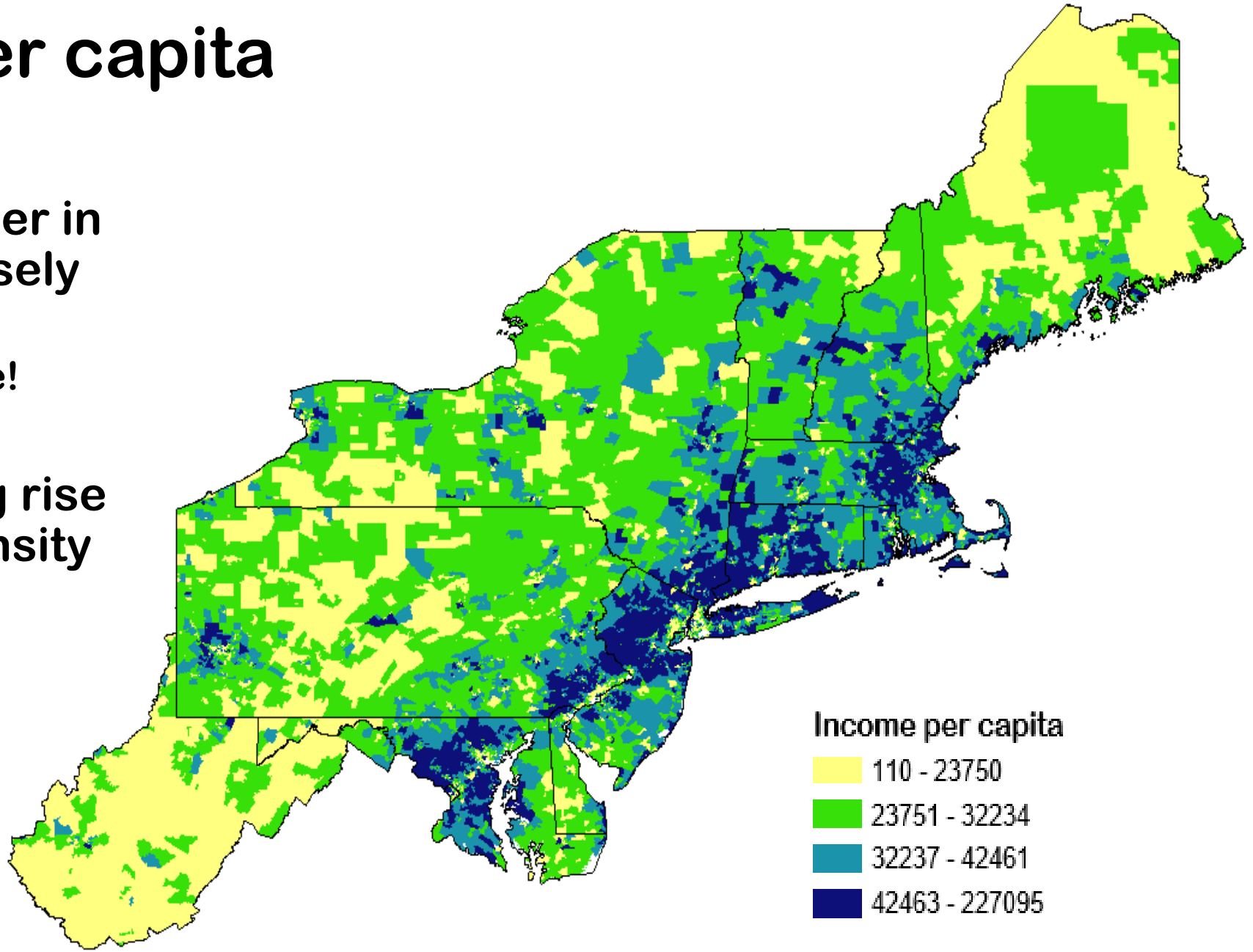
- More people per square mile in cities



Data source: U.S. Census, American Community Survey 2012-2016

Income per capita

- Income also is higher in cities, or more densely settled places
  - But not everywhere!
  - Inner cities
- Also, costs of living rise with population density



Data source: U.S. Census, American Community Survey 2012-2016

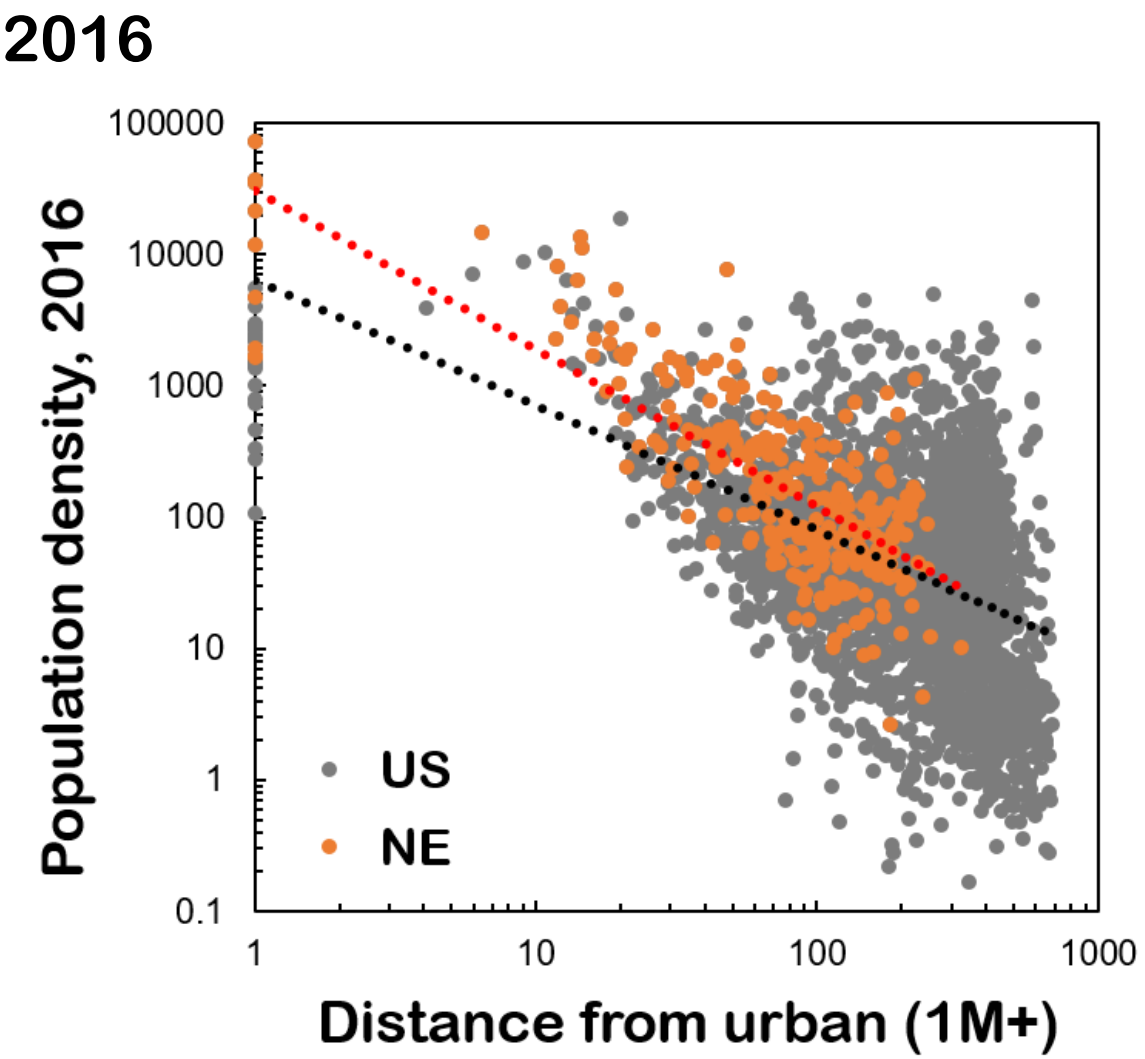
Northeast

Northeast as a percent of U.S.	%
Land area	5.6
Population	20.4
GDP or Income	24.0

Data source: U.S. Department of Commerce, BEA. U.S. Census, American Community Survey 2012-2016 and Population Estimates

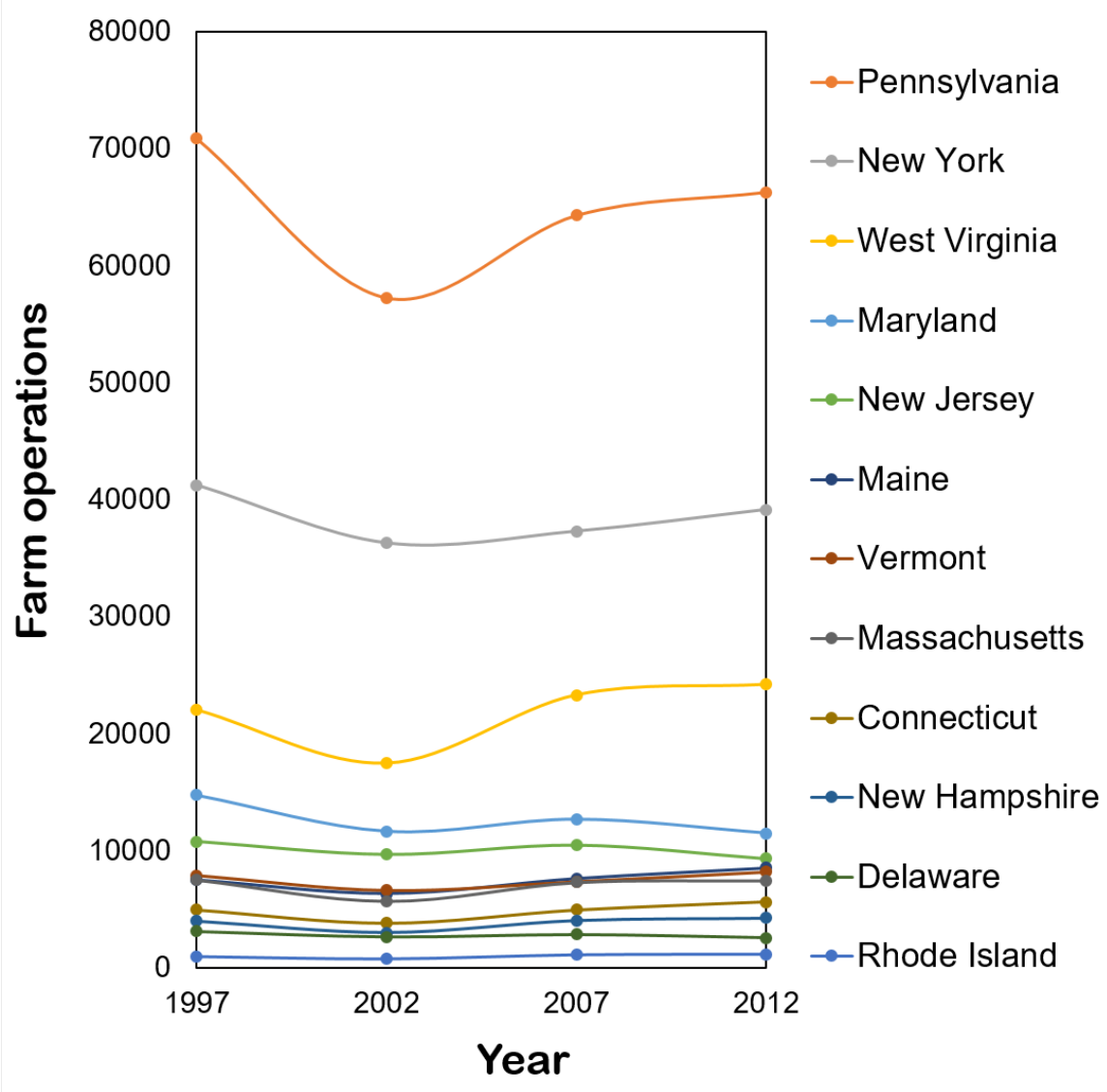
Pop density vs. distance from metro areas

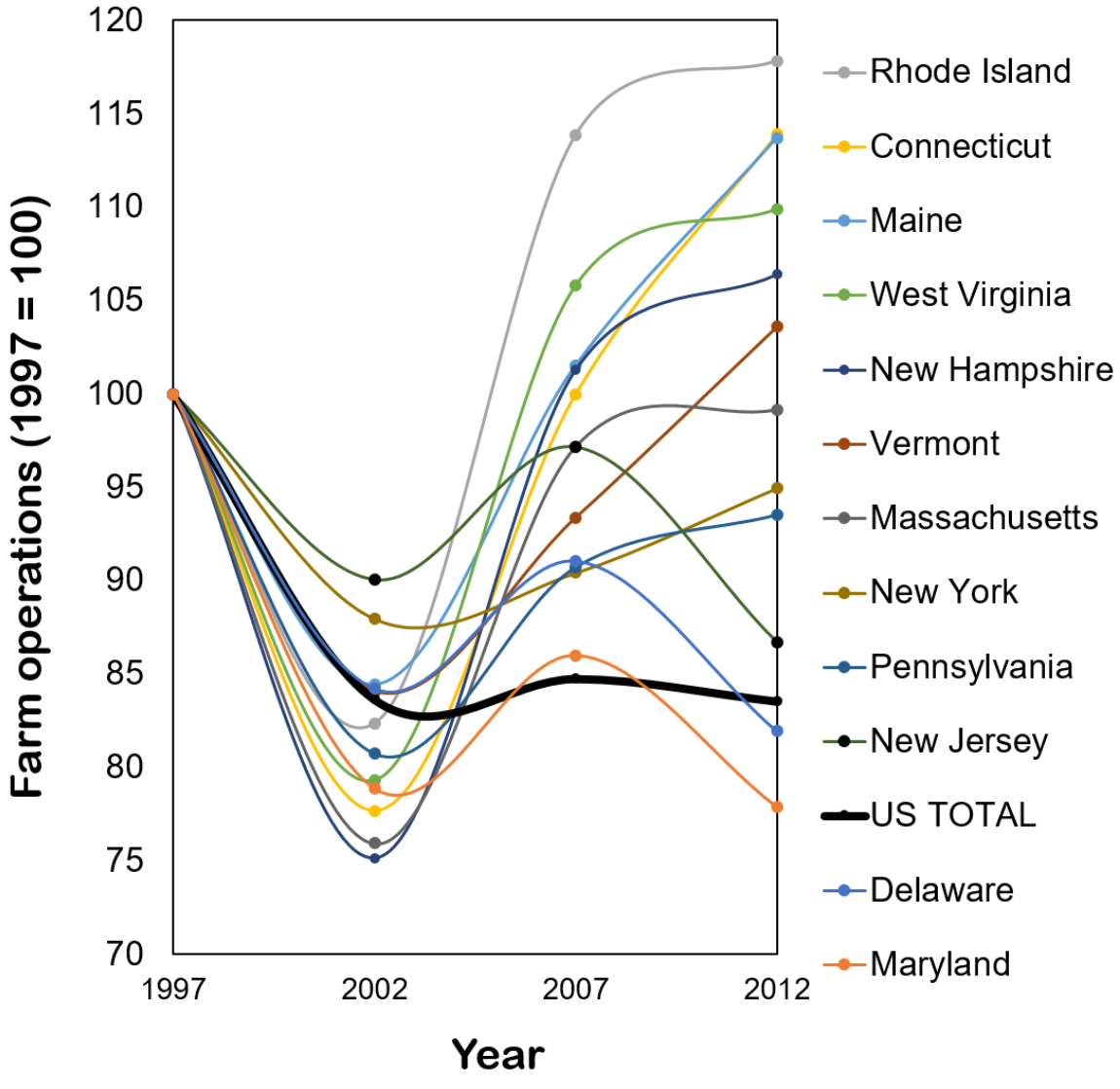
In the Northeast: metro areas have higher density, and rural residents are closer to metros than is true nationally.



Data source: U.S. Census, Population and Housing Unit Estimates

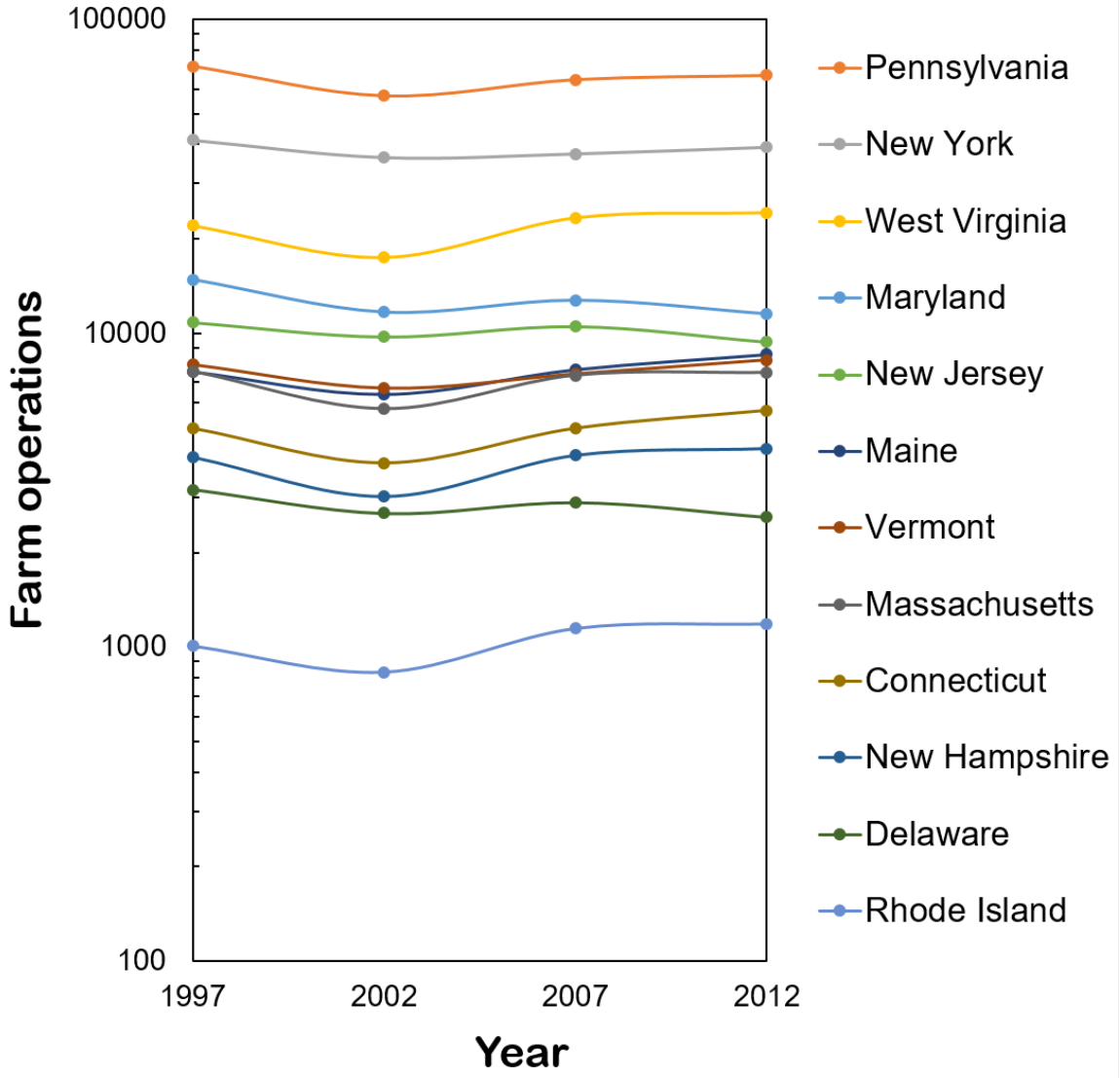
Farm operations

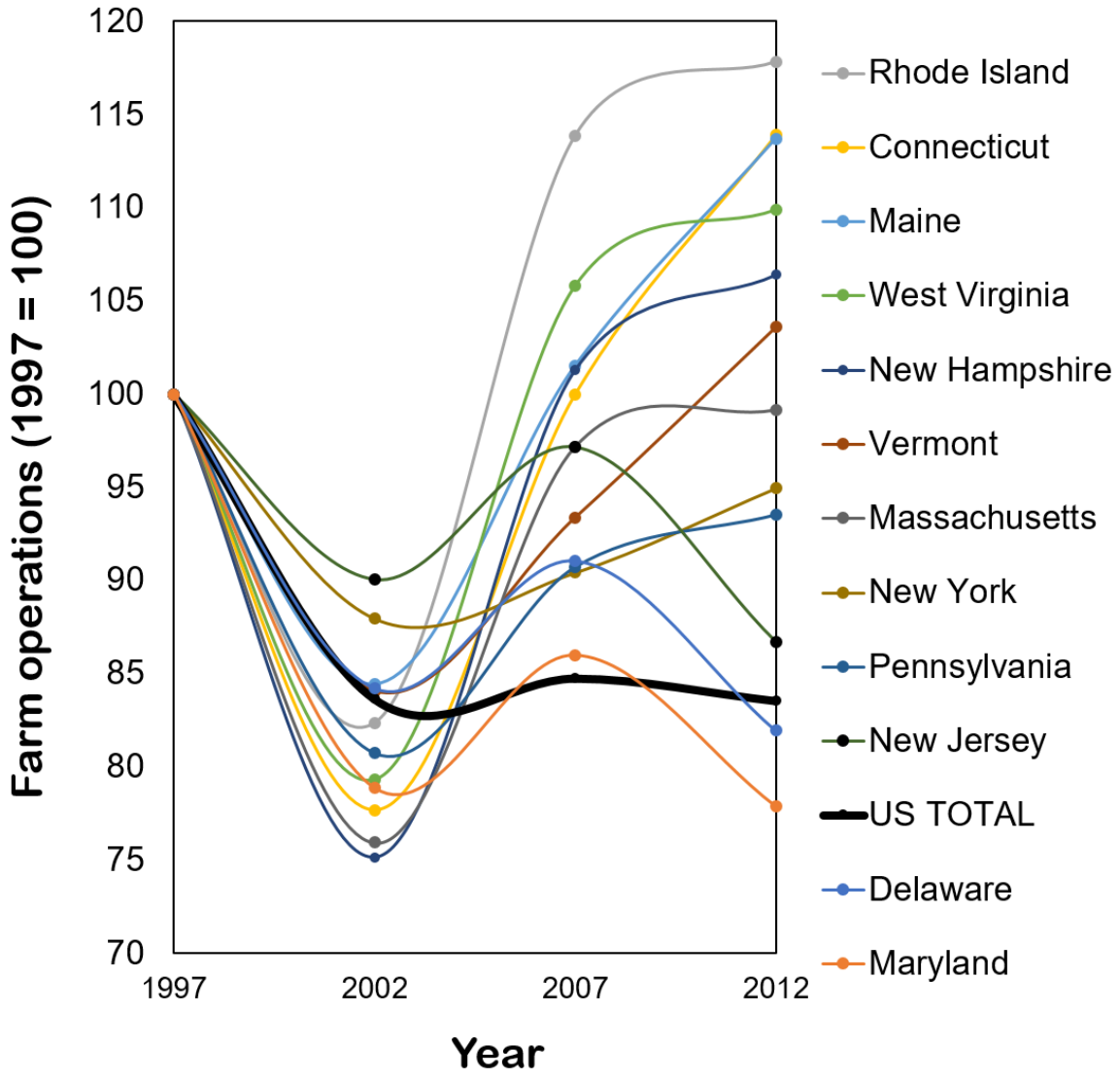




Data source: USDA National Agricultural Statistics Service, AG Census

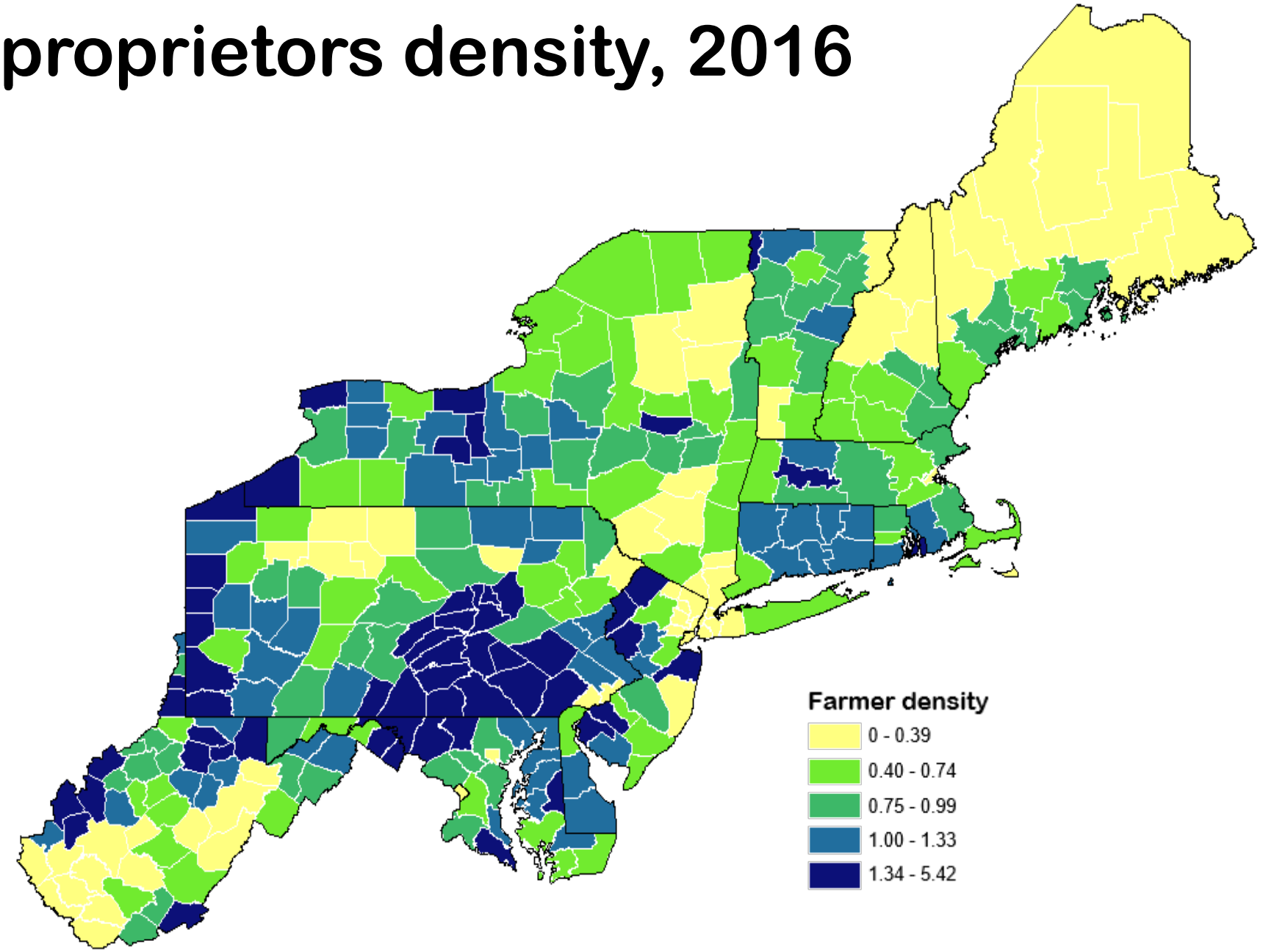
Farm operations





Data source: USDA National Agricultural Statistics Service, AG Census

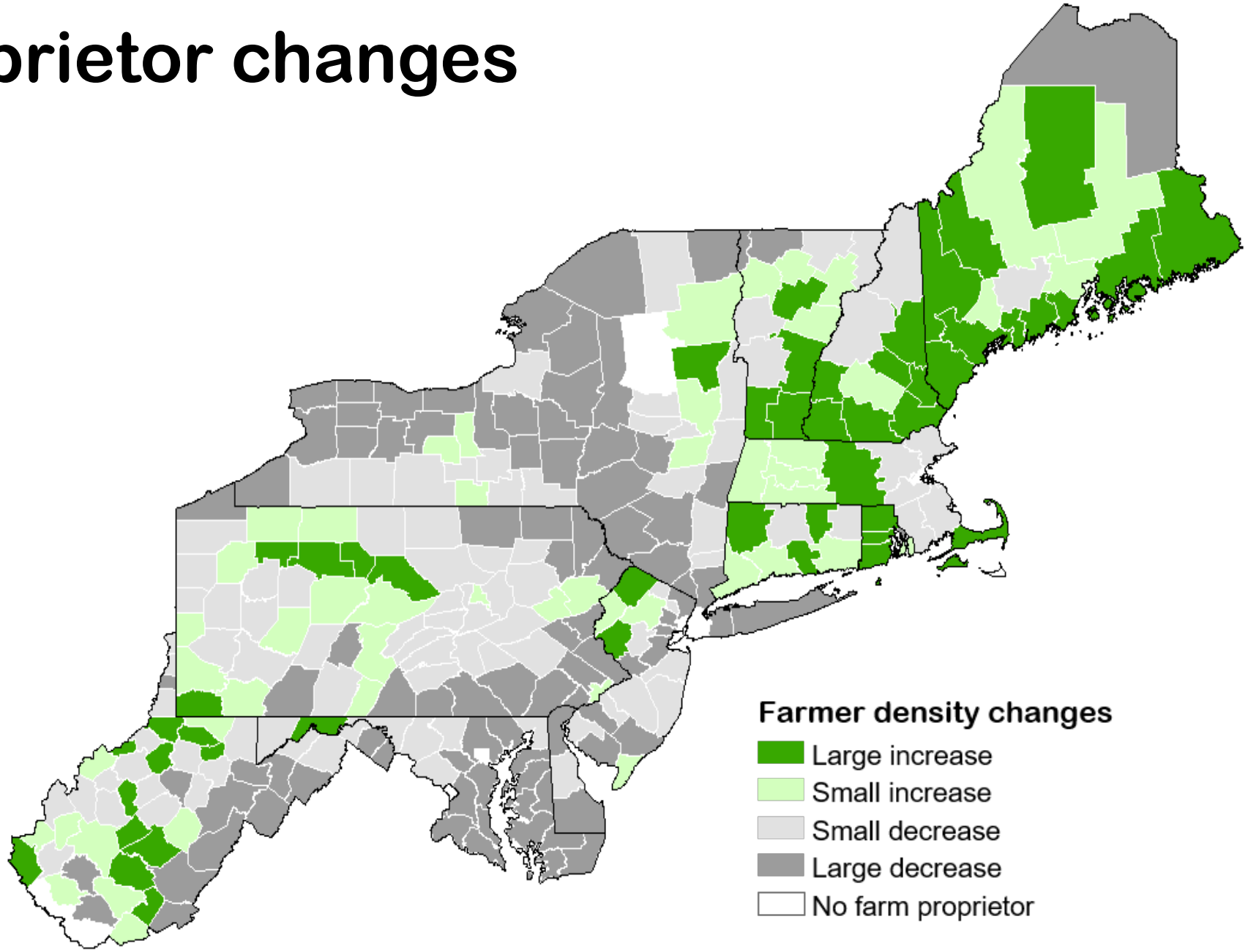
Farm proprietors density, 2016



Farmer density = # farm proprietors / land area (square miles). Data source: U.S. Department of Commerce, Bureau of Economic Analysis

Farm proprietor changes

- 1970-2016
- percent changes



Farmer changes = (farmer density 2016 - farmer density 1970) / farmer density 1970. Data source: U.S. Department of Commerce, BEA

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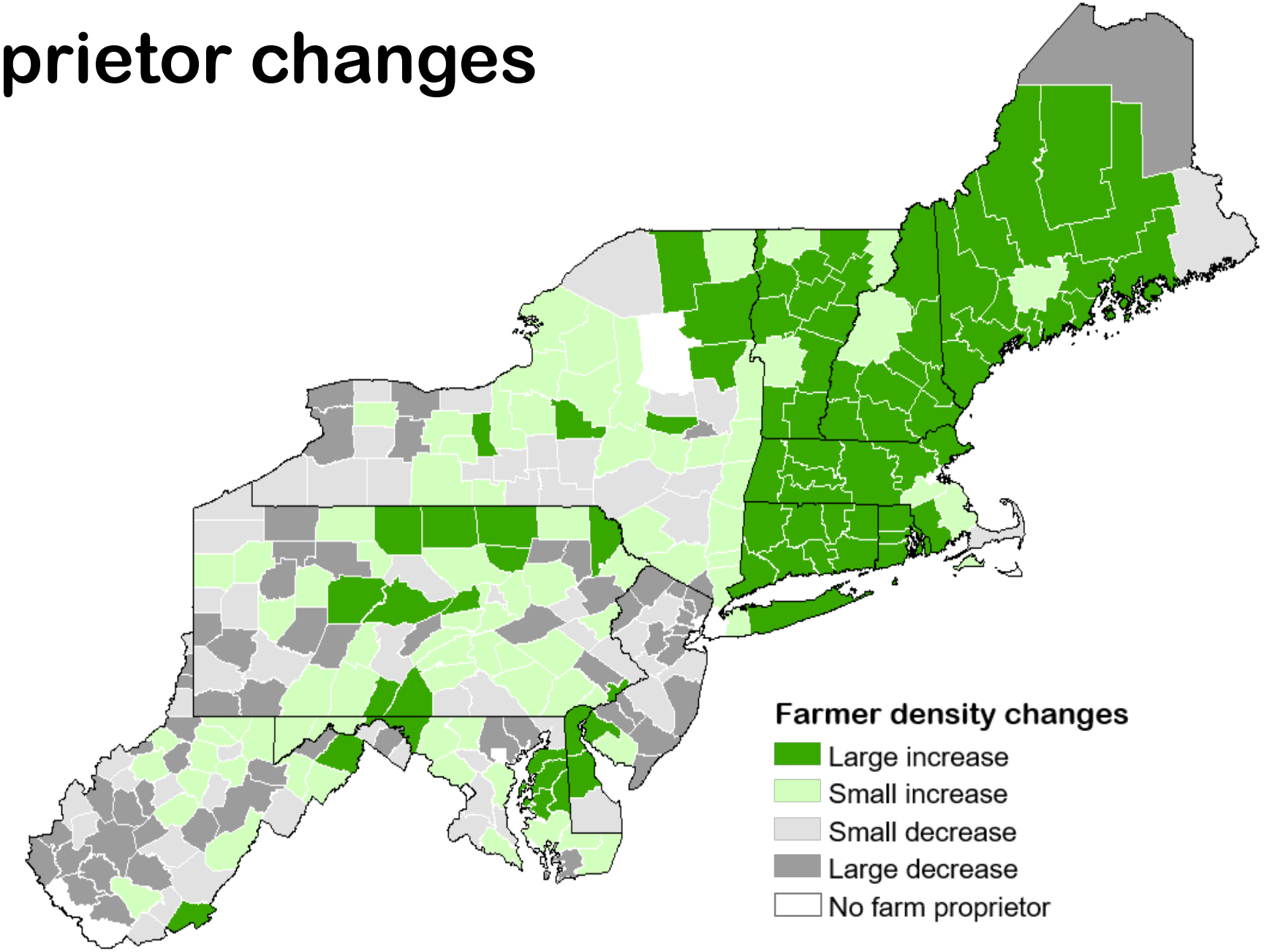


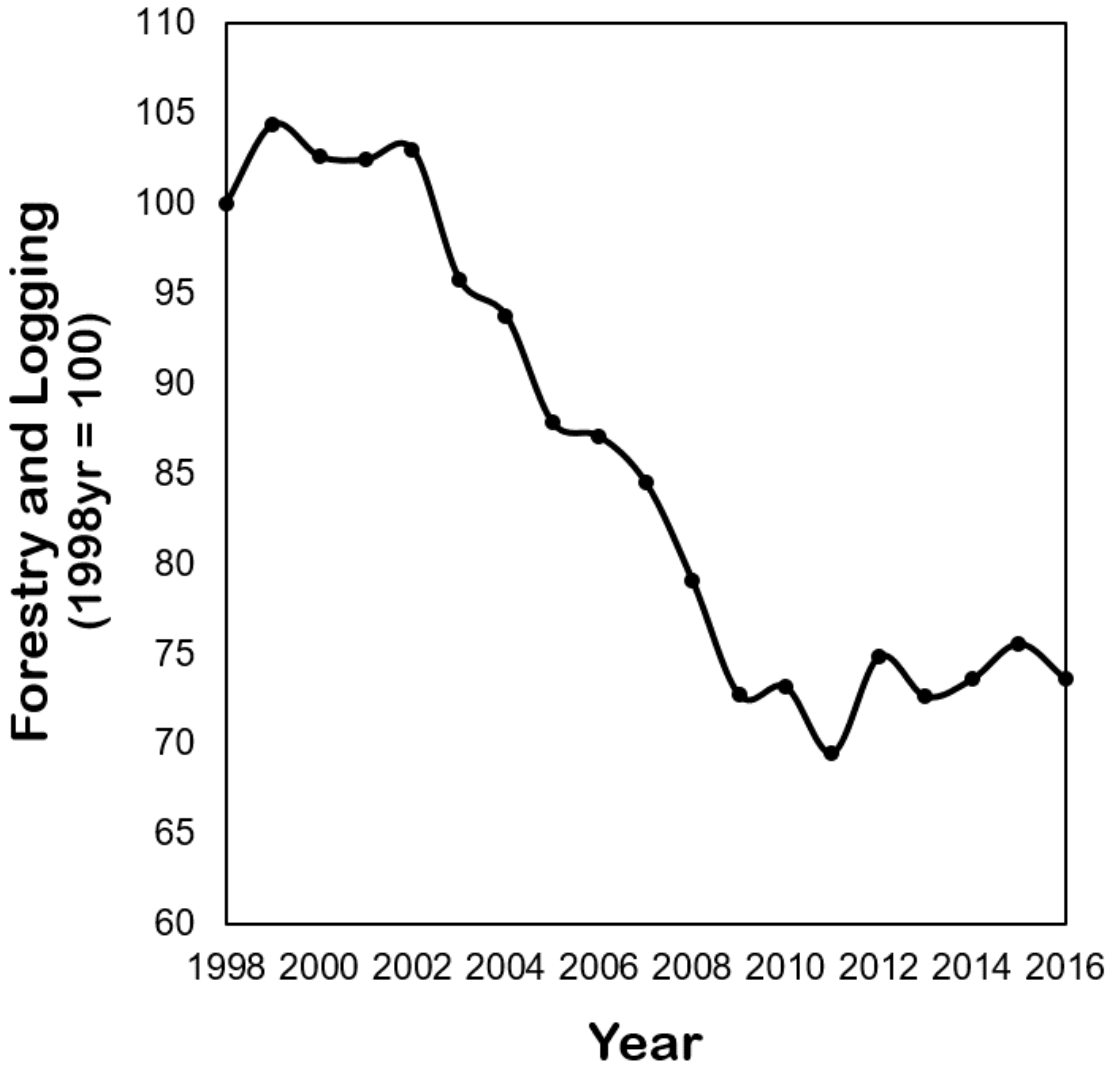
Farmer changes = (farmer density 2016 - farmer density 2006) / farmer density 2006. Data source: U.S. Department of Commerce, BEA

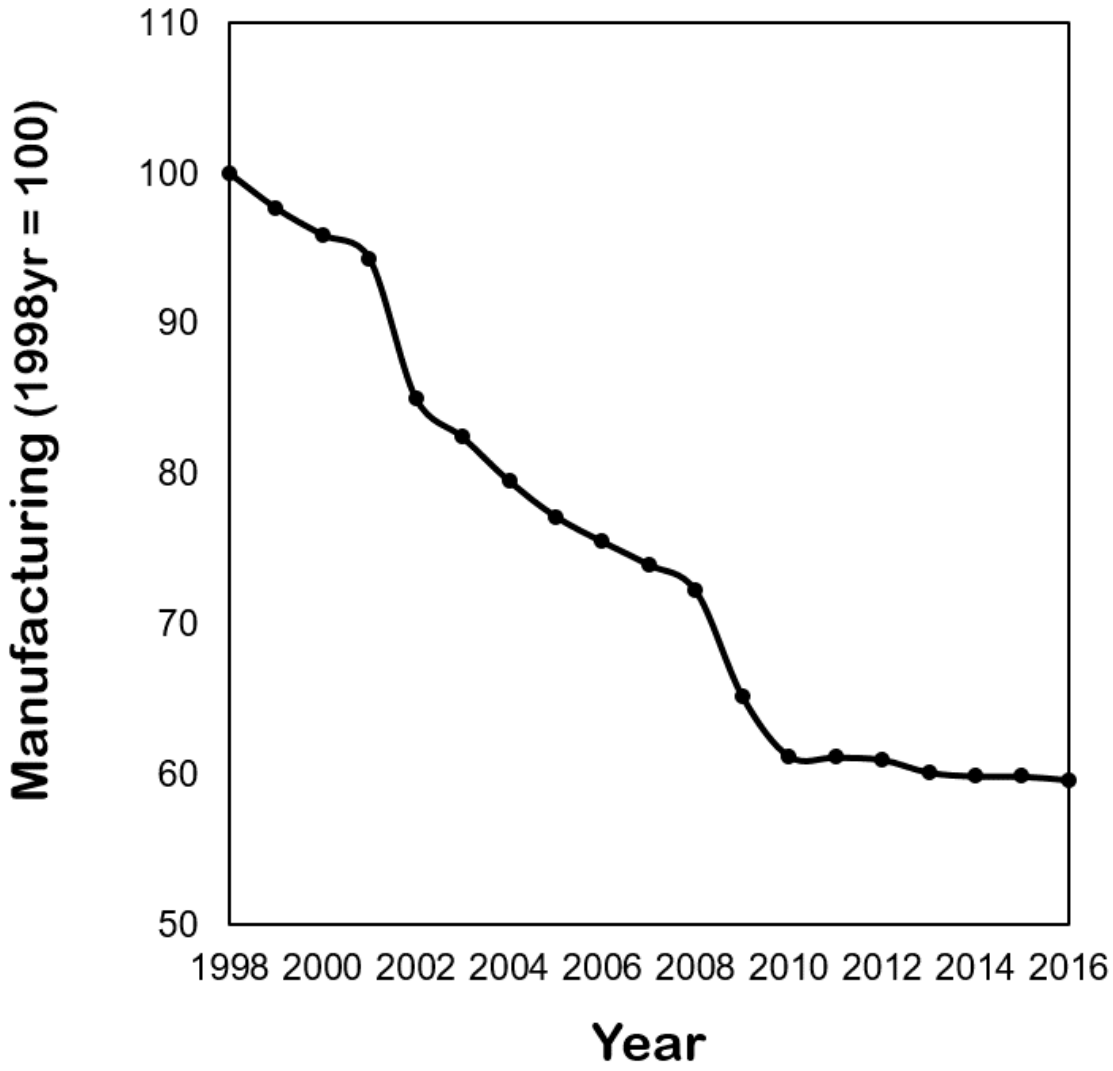
Global shifts in production

Global shifts in production

- Account for rising populism, rural resentment?
- Rising rates of opioids-related death: supply vs. demand
- Ten of top 12 states in death rates are in the Northeast
- Opportunities for land grant research and outreach
  - CAPE project (NCRCRD), funded by SAMHSA
  - 4-H, PROSPER
  - Role of Ag Education programs (D. Foster, PSU)

Employment in the NE region, two sectors





Data source: U.S. Census, County Business Patterns, 1998-2016

Global shifts in production (OECD 2018)

- Rural areas need to specialize, develop core competencies and promote tradables
- Be open to outside investment, promote linkages between local start-ups and firms, consumers elsewhere
- Need to raise competitiveness through innovation, skills investment

Understanding, supporting rural innovation

- Innovation is occurring in rural areas
- *Innovation Places*
  - L. Brown, UConn
- AMSTA LFPP and FMPP training provided in all 50 States+
  - Business and market innovation
  - Local Food and Farmers Market Promotion Program
- New NIFA grant
- Rural workforce development needs

Rise of emerging economies

Rise of emerging economies (OECD 2018)

- Economic center of gravity shifting → Asia, Africa, L. America
- Growing demand from expanding middle class for raw materials, food and technologies from rural U.S. areas
  - e.g., demand for U.S. beer in Africa; hops
- Opportunities for rural U.S. firms to sell services that support…
  - rising ag productivity
  - energy production
  - sustainable management of land, water resources
- Expand links with emerging countries

Climate Change and Environmental Pressures

Climate Change and Environmental Pressures

- Shifts in agricultural production patterns
- Artificial “meat” production?
  - Conflict over hog farming in NC, also central PA
- Coastal areas threatened the most by rising water
- And 60% of world pop faces water scarcity by 2050[1]

[1]United Nations World Water Development Report 2018

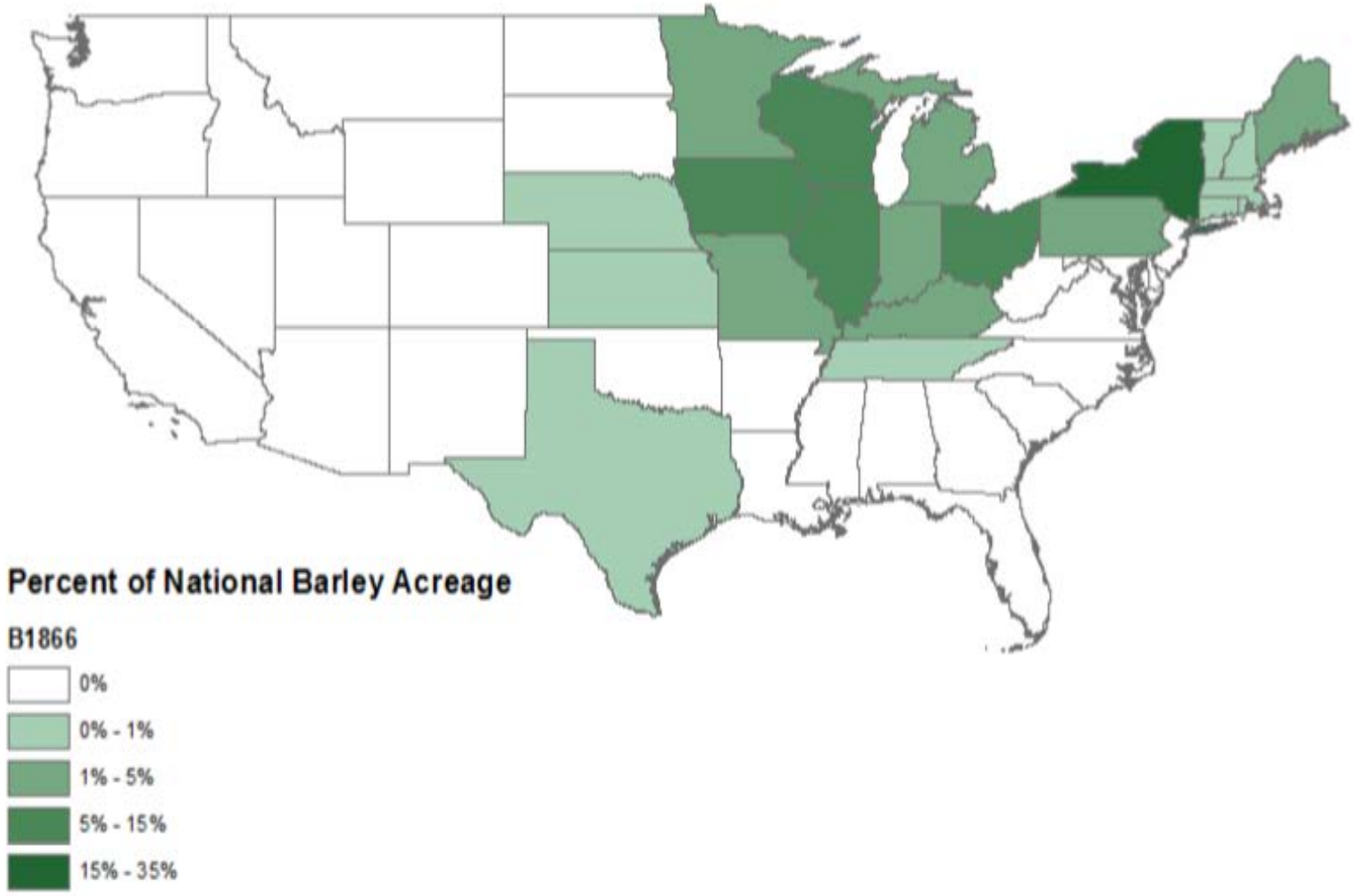
Historical Barley Acreage since 1866,

based on NASS Survey Data

Preliminary; graphs in later years exclude states with <0.005% of U.S. total

Percent of National Barley Acreage grown, state

1866

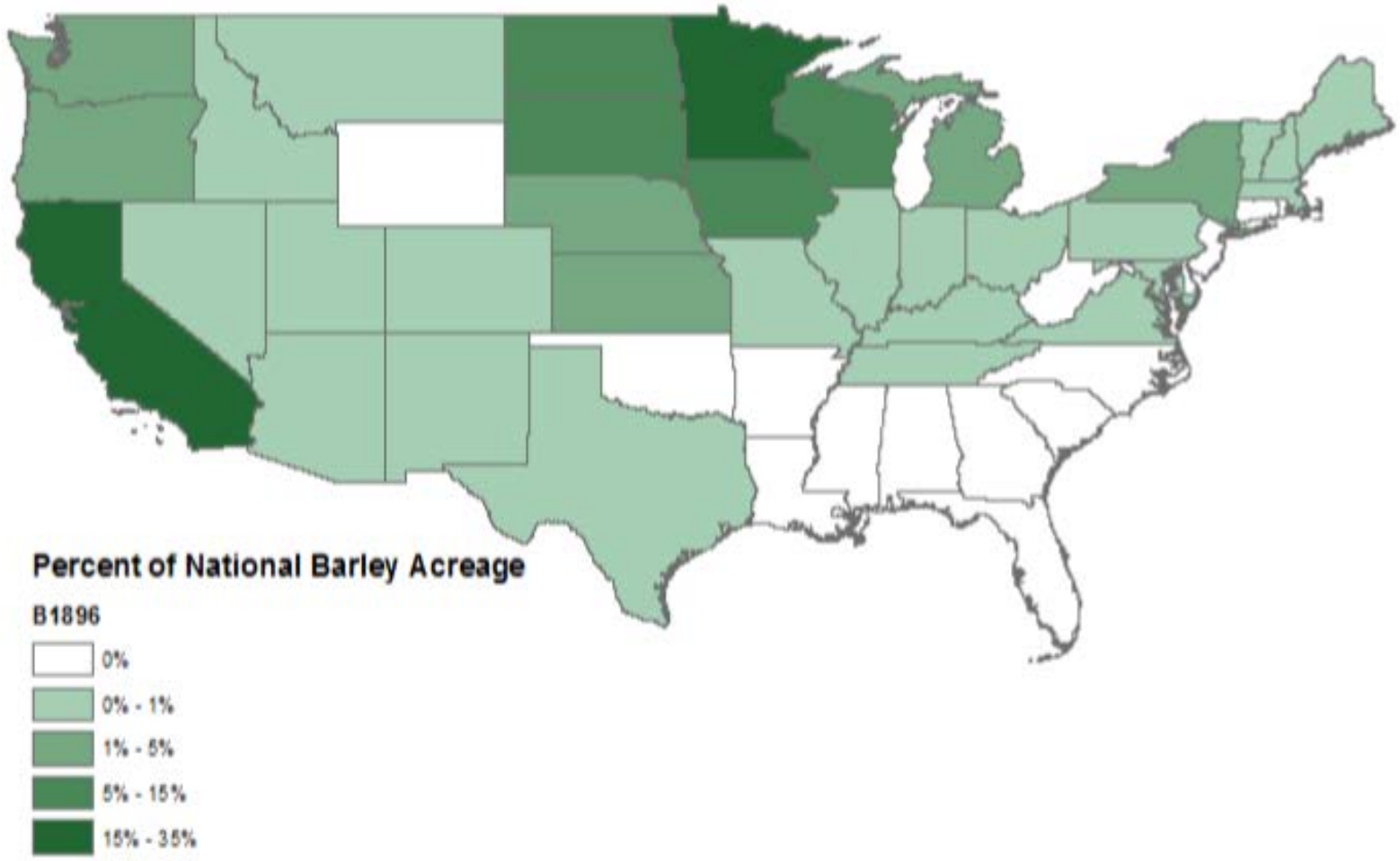


Map prepared by NERCRD, using NASS Census Data

Percent of National Barley Acreage grown, state

Hatch Act of 1887 in effect

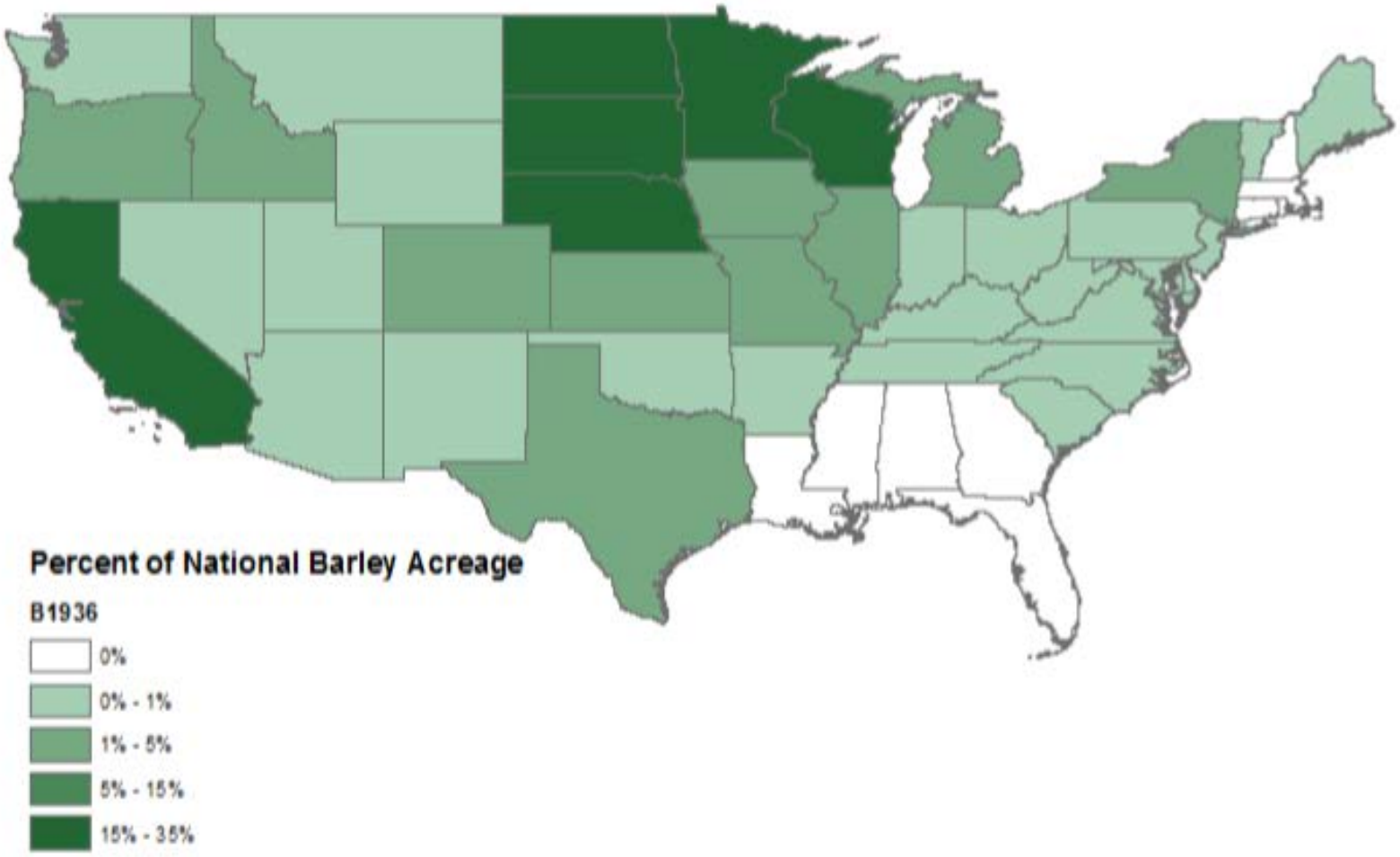
1896



Map prepared by NERCRD, using NASS Census Data

Percent of National Barley Acreage grown, state

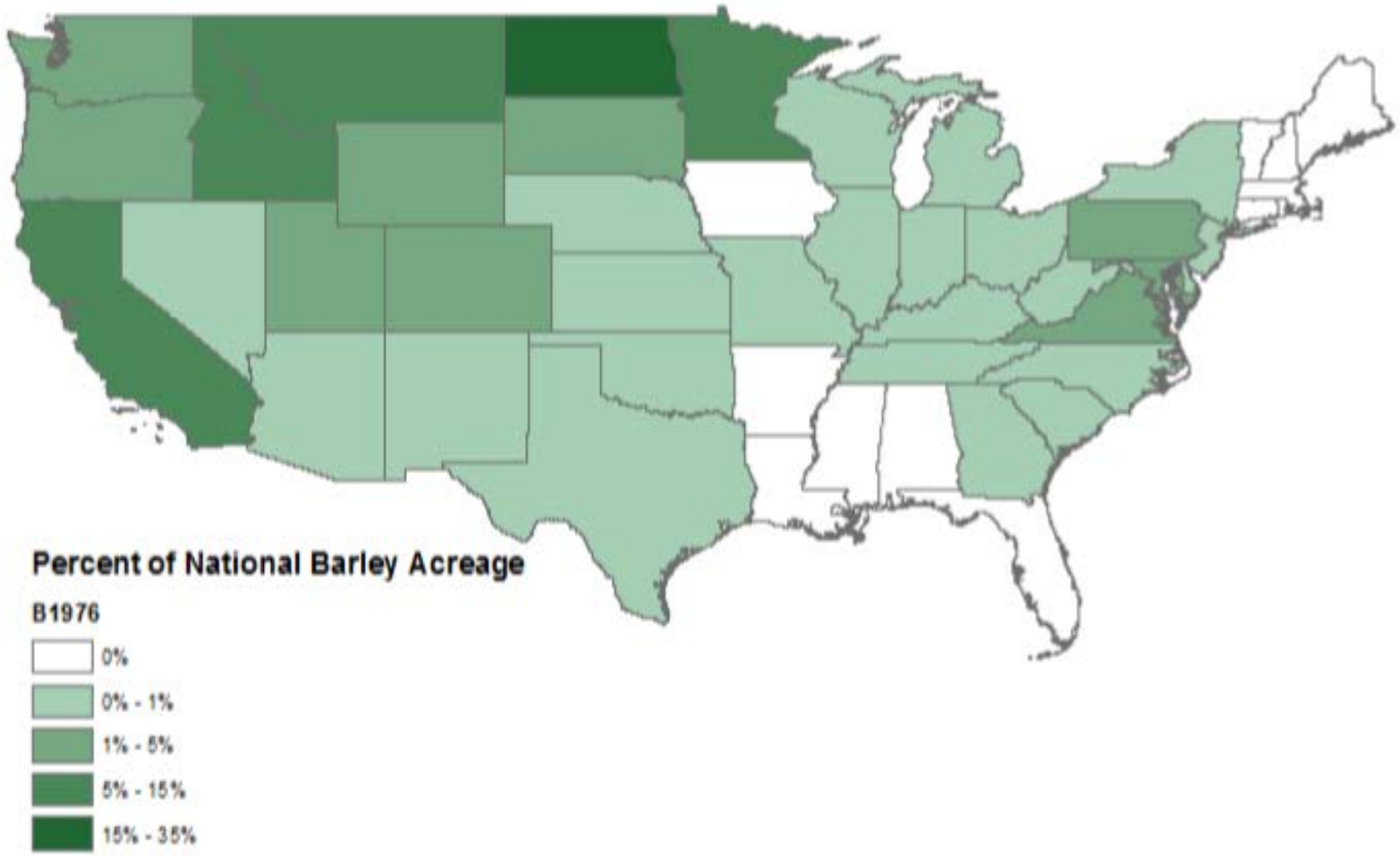
1936



Map prepared by NERCRD, using NASS Census Data

Percent of National Barley Acreage grown, state

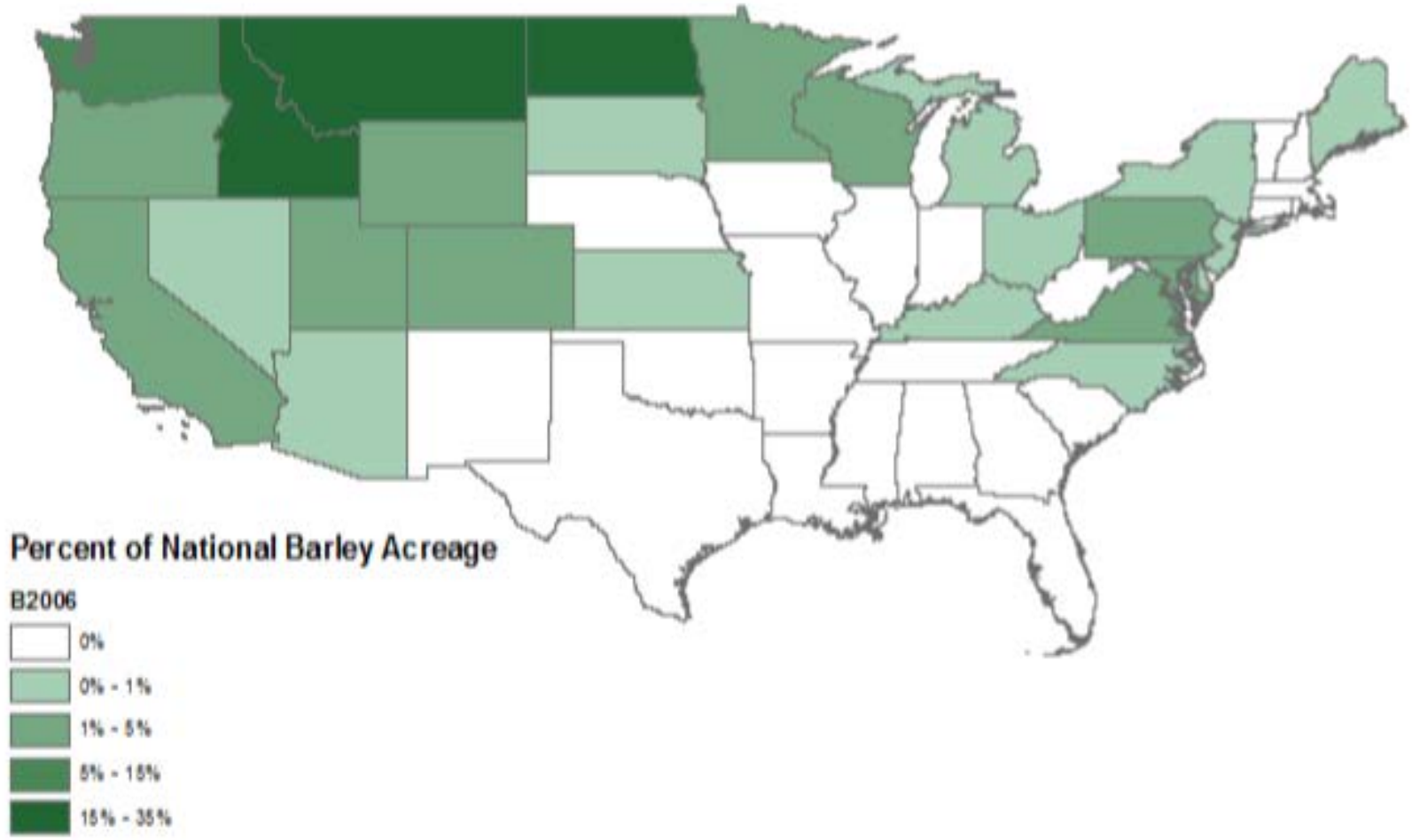
1976



Map prepared by NERCRD, using NASS Census Data

Percent of National Barley Acreage grown, state

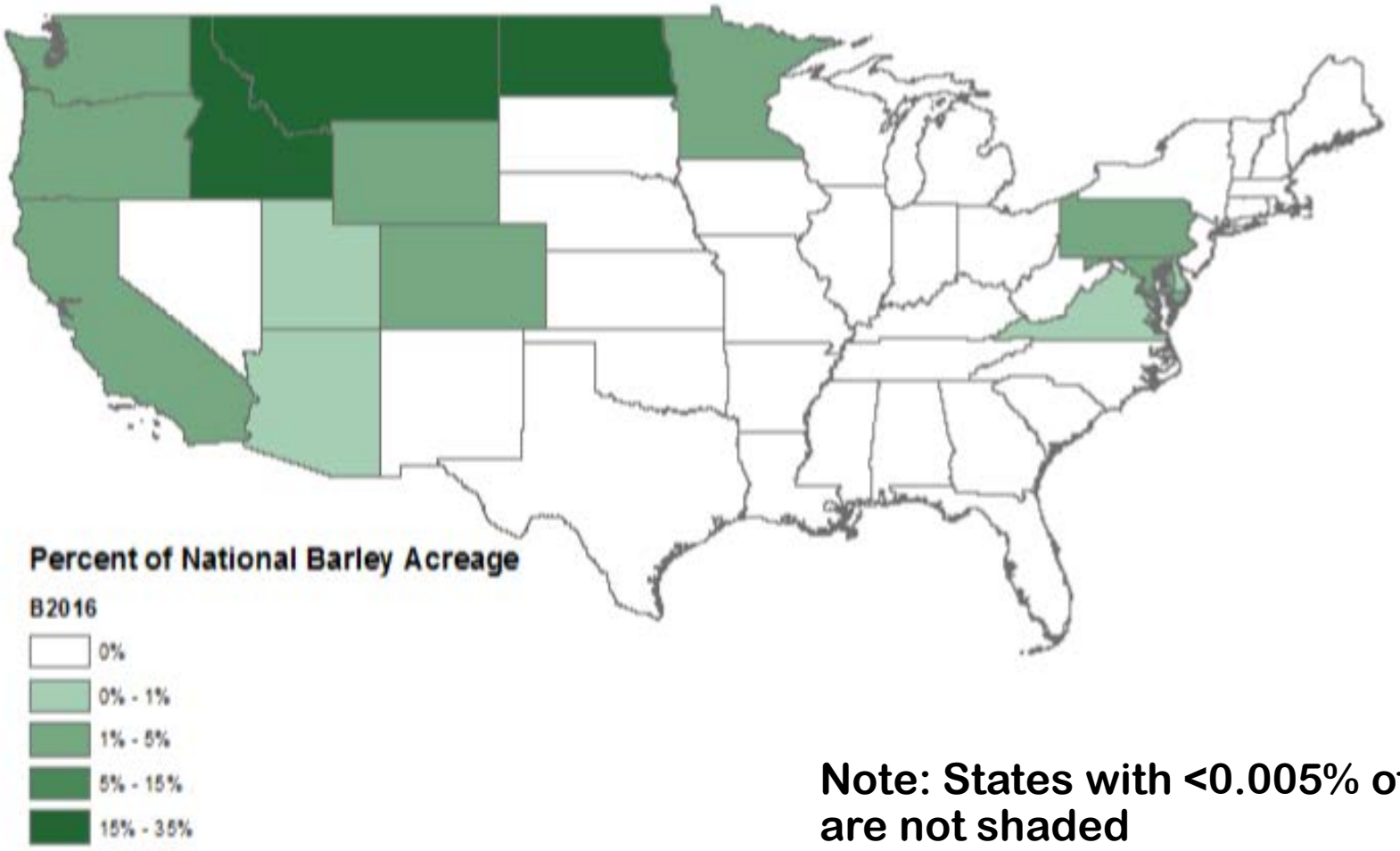
2006



Map prepared by NERCRD, using NASS Census Data

Percent of National Barley Acreage grown, state

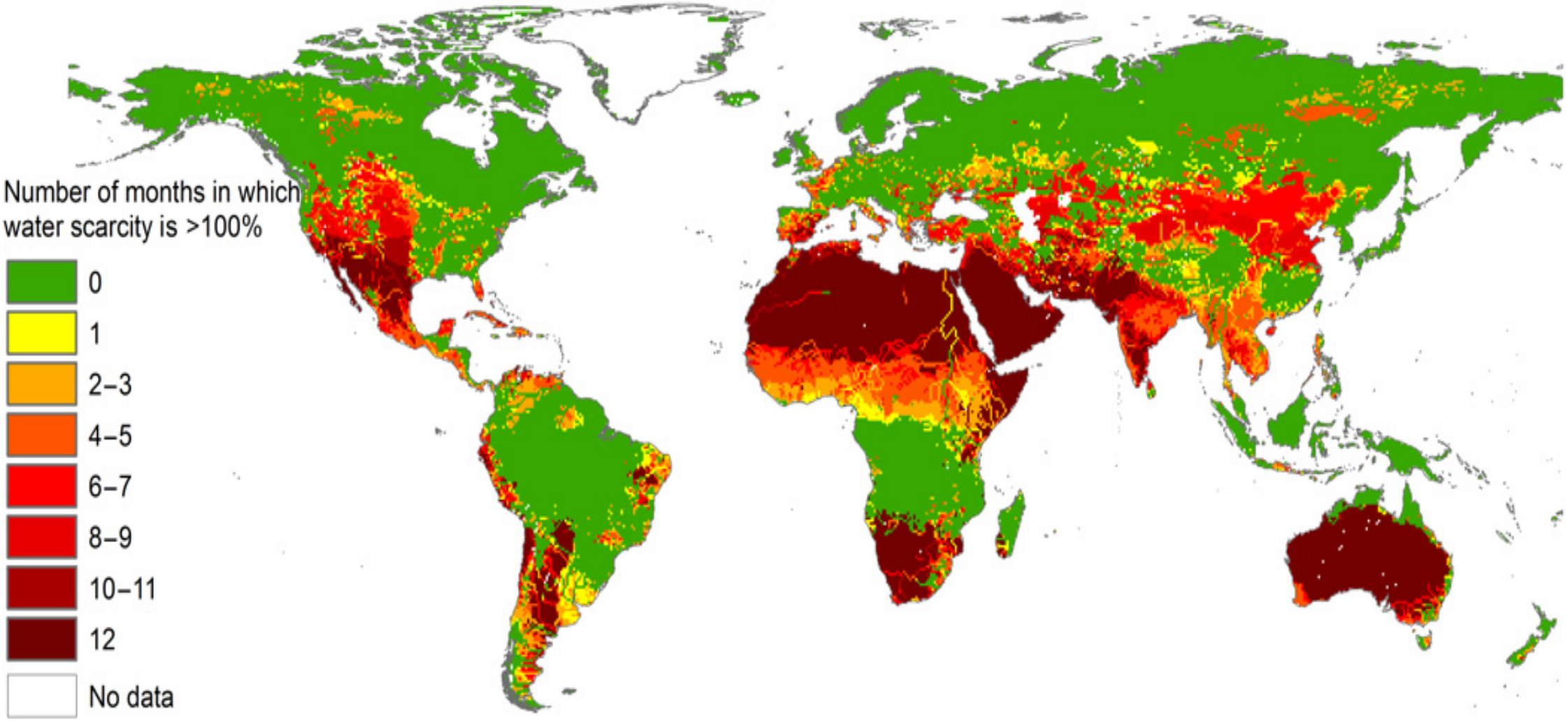
2016



Note: States with <0.005% of U.S. total are not shaded

Map prepared by NERCRD, using NASS Census Data

Water Scarcity around the Globe



Source: National Geographic Education Blog. https://natgeoeducationblog.files.wordpress.com/2016/02/water-scarcity-map.jpg

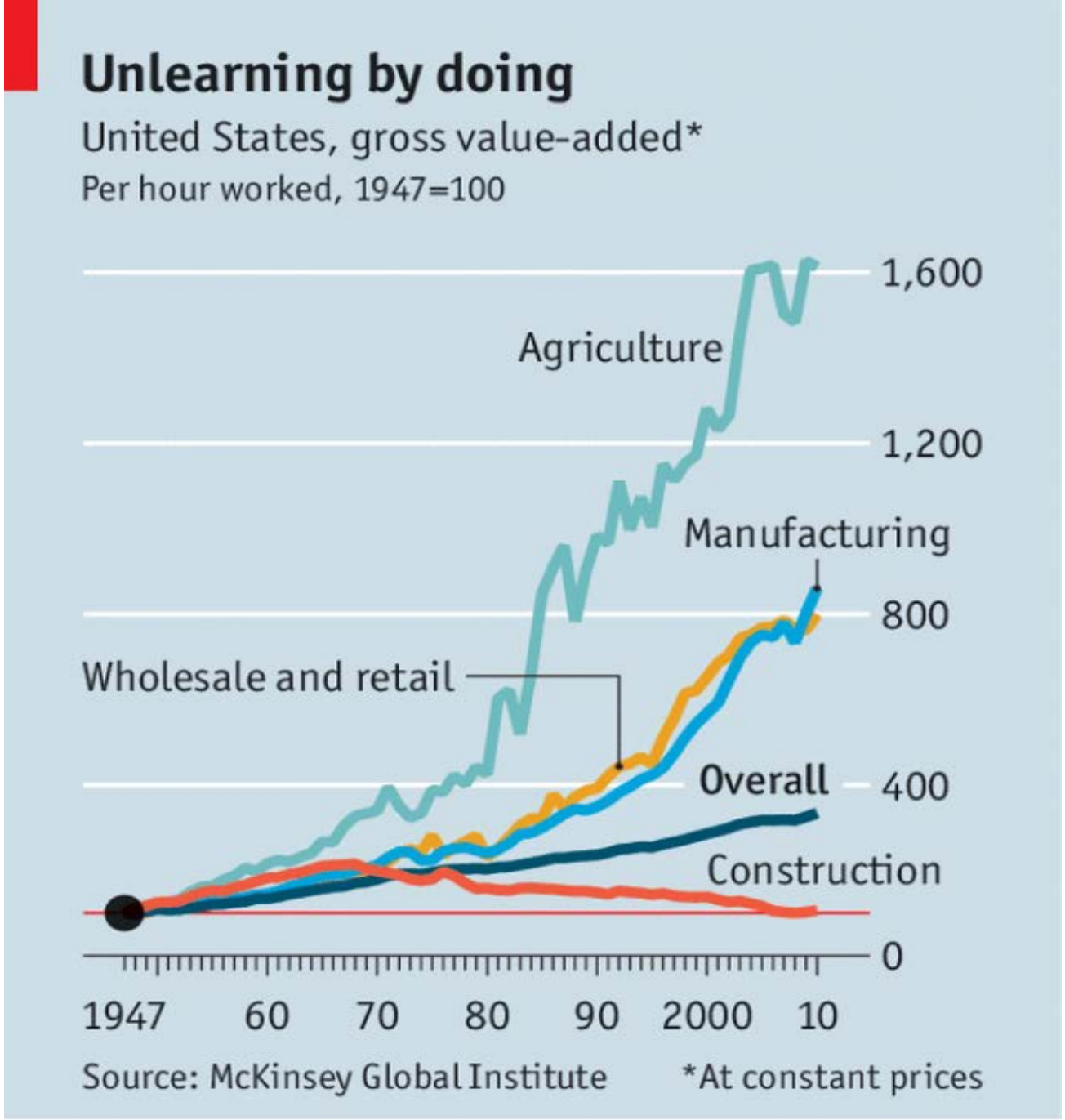
Climate Change and Environmental Pressures

OECD 2018:

- Will need even more efficient use of resources, and technologies that enable this
- Rural areas can benefit by investing in renewable energy, and the “circular economy”

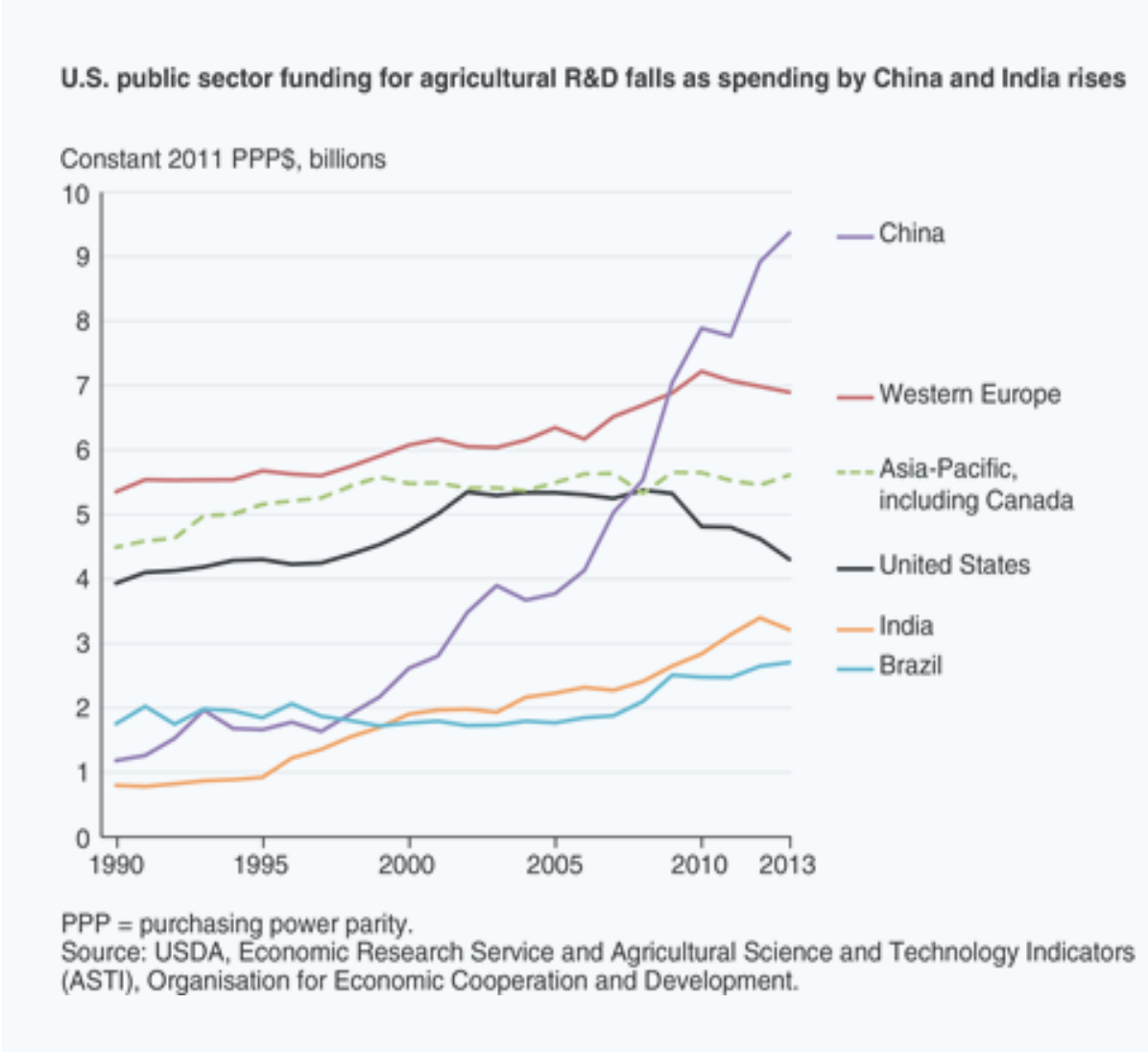
Technological Breakthroughs (Innovation)

Phenomenal advances in Ag labor productivity compared to other sectors, 1947-2010…



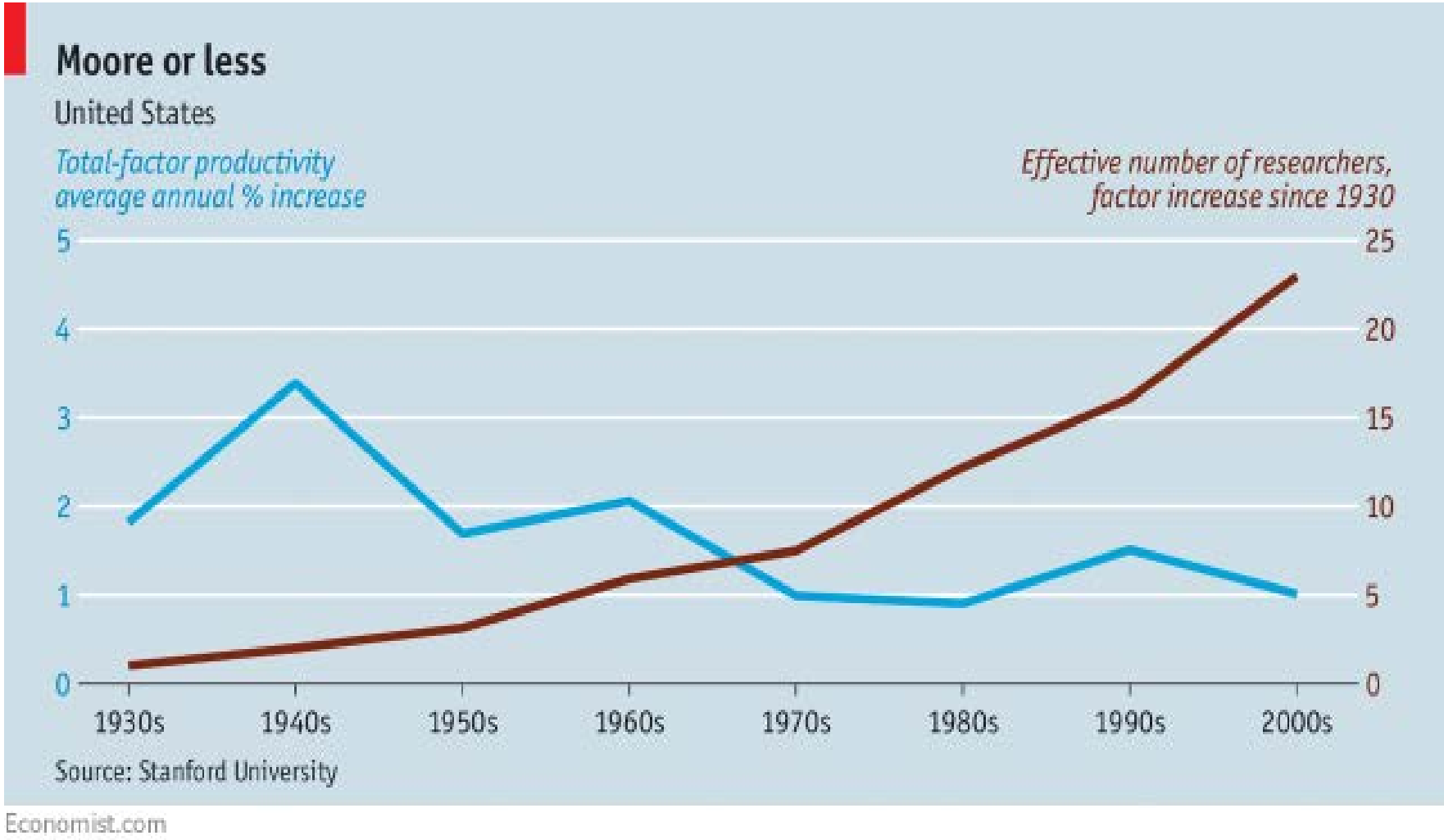
https://www.economist.com/news/business/21726714-american-builders-productivity-has-plunged-half-late-1960s-efficiency-eludes

But public funding of U.S. agricultural R&D is falling…



https://www.ers.usda.gov/amber-waves/2016/november/us-agricultural-rd-in-an-era-of-falling-public-funding/

…even as costs of creating new knowledge are rising



The Economist, Sep 30th, 2017 “The cost of innovation has risen, and productivity has suffered.”

Technological breakthroughs (OECD 2018)

- Artificial intelligence, automation, robotics, drones…
  - Decentralized energy production; cloud computing; IoT; nano tech
- New production possibilities, ways to access goods & services
- More product innovations in agriculture, other sectors
- New jobs in 3-D printing, drones for transporting goods
- New opportunities for online learning, digital literacy

- → assumes broadband available [RRDC eConnectivity project]

Consumers!

Consumer tastes and preferences

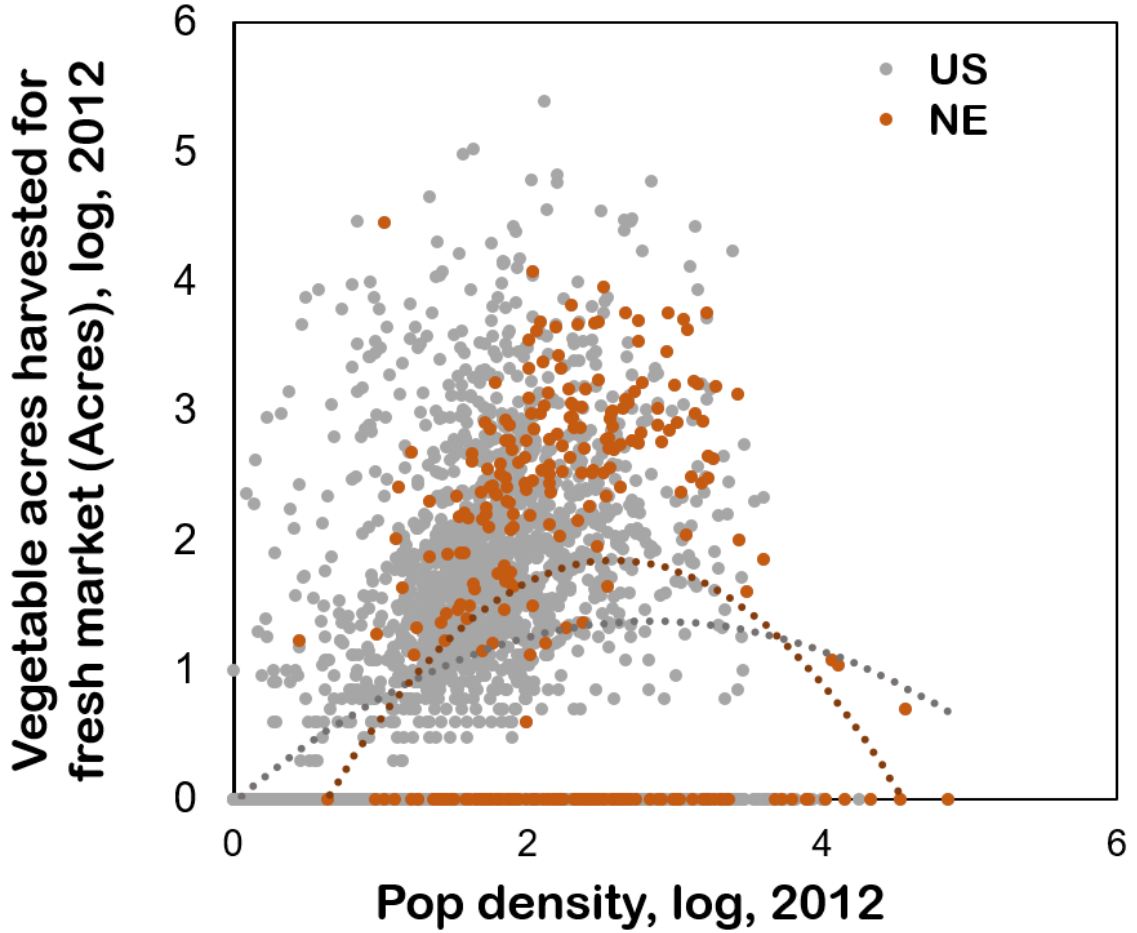
- Demand for local has staying power
  - Urban/suburban food production (UDC programs; robotics)
- Demand for “newer” or niche foods
  - Mushrooms as new health food (B. Beelman, PSU)
    - selenium, vit D, glutathione and ergothioneine: beneficial to healthy aging
  - Cider production (Cornell, PSU courses)
  - Nutrient dense foods (NERCRD EFSNE project)
- Minority farmers producing niche crop
  - Scotch bonnet peppers, calabaza squash; A. Wetherill, DSU

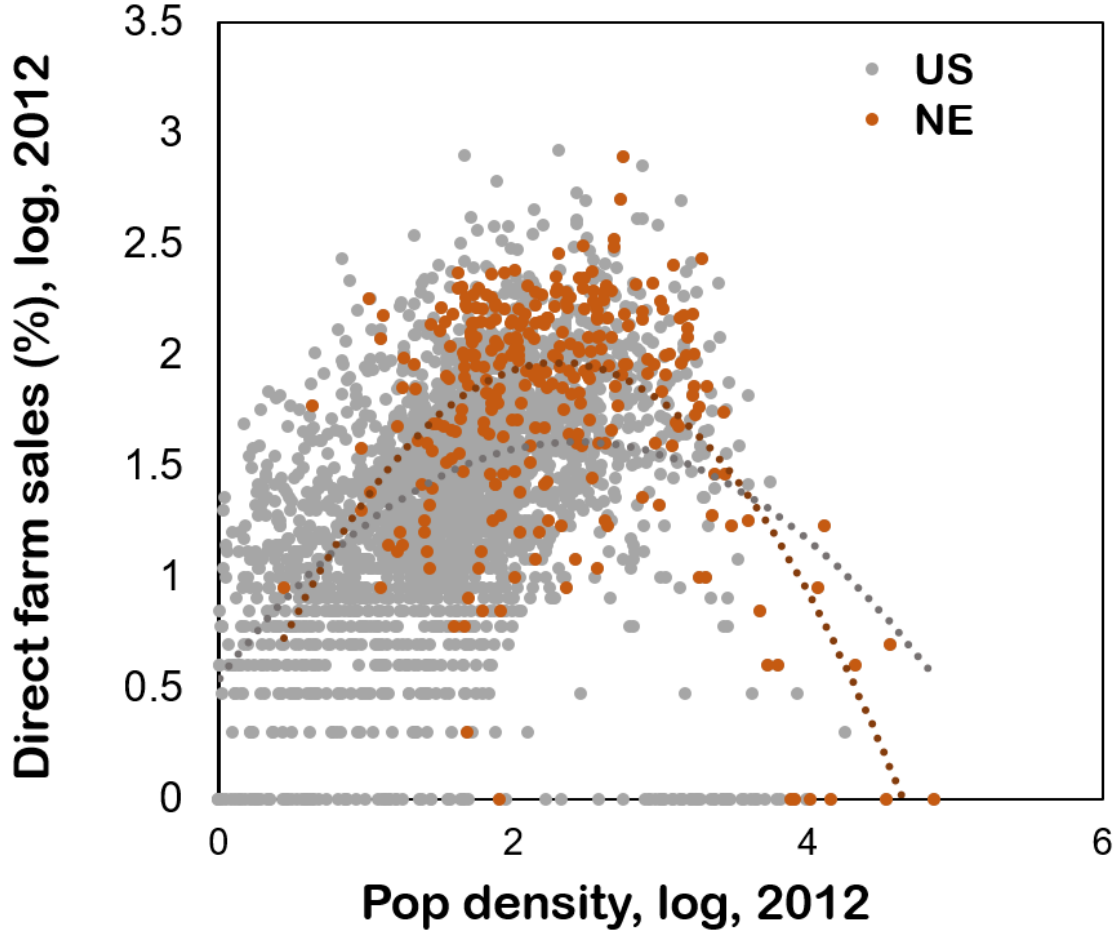
Agriculture in the NE region

Northeast as a percent of U.S.	%
Crop land (acres)	3.4
Wood land (excl. pastured, acres)	13.4
Animal product, operations	8.4
Vegetable, harvested, fresh market	10.2
Direct farm sales	33.0
Agritourism receipts	15.4

Data source: U.S. Department of Commerce, BEA. USDA, National Agricultural Statistics Service, 2012 AG Census

Fresh market vegetables and direct farm sales vs. population density

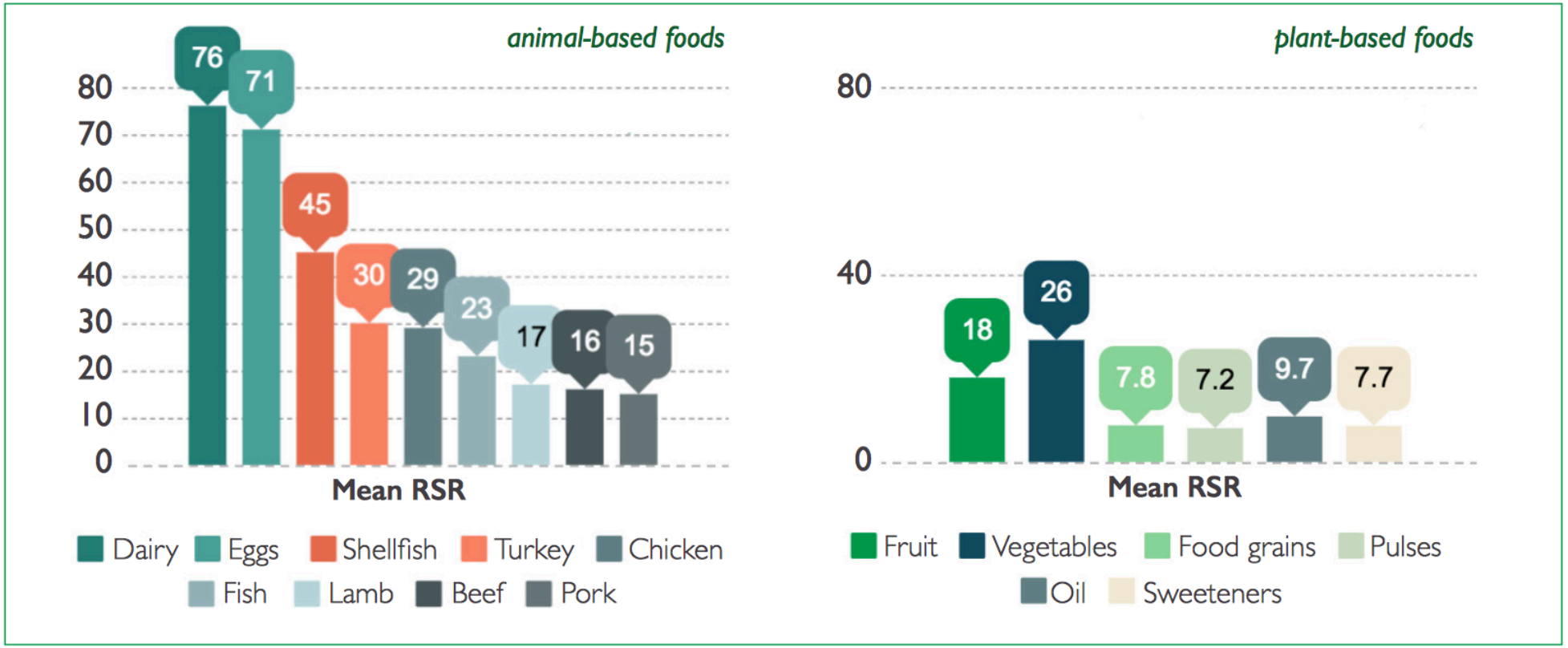




Data source: U.S. Census, Population and Housing Unit Estimates. USDA ERS, Food Environment Atlas.

How Self-Reliant is the Northeast Food System?

Based on research conducted under the NERCRD's Food Security Project



The charts above show the regional self-reliance score for several animal-based and plant-based foods. To arrive at these scores, the researchers divided the amount produced in the region (by weight) with the amount consumed (by weight), and the resulting score is given as a percentage. For example, the region produces 76 percent of the amount of milk consumed in the region and 26 percent of the amount of vegetables consumed in the region.

T. Griffin, Z. Conrad, C. Peters, R. Ridberg and E. Parry Tyler (2015) *Renewable Agriculture and Food Systems*, 30(4). Also available for livestock feed.

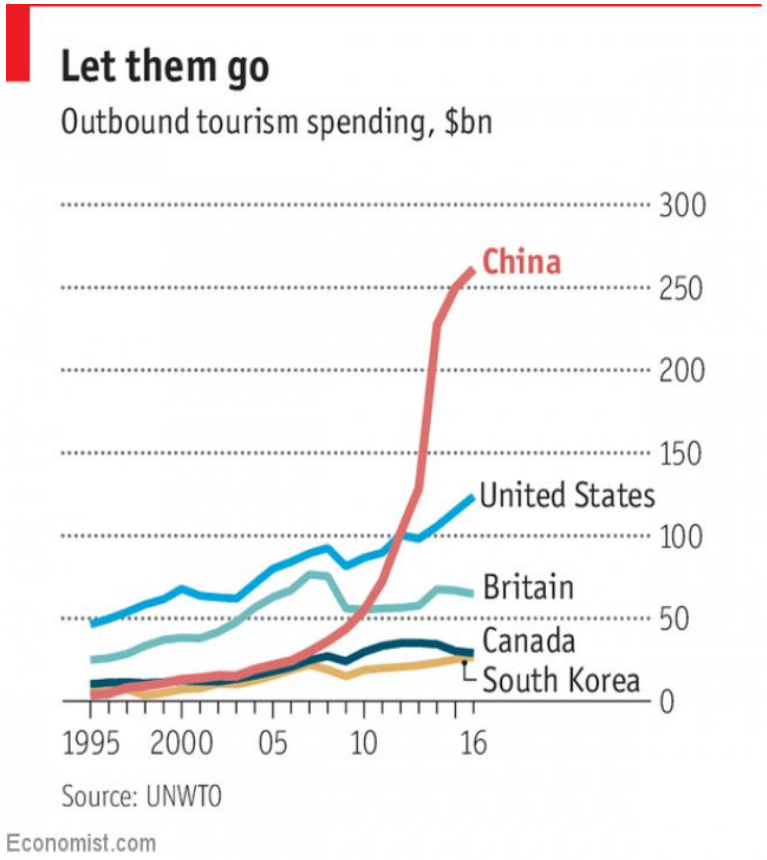
Recreational Economies/tourism (U.S.)

- **Growth in recreation value-added has been double that of U.S. GDP in 3 of last 4 years: $373.7 bn. total in 2016[1]**
- **About twice the value of farming, forestry and fisheries (caveat)**

[1]BEA (2018) *Outdoor Recreation Satellite Account: Prototype Statistics for 2012-2016*; https://www.bea.gov/newsreleases/industry/orsa/2018/pdf/orsa0218.pdf

Recreational Economies/tourism (U.S.)

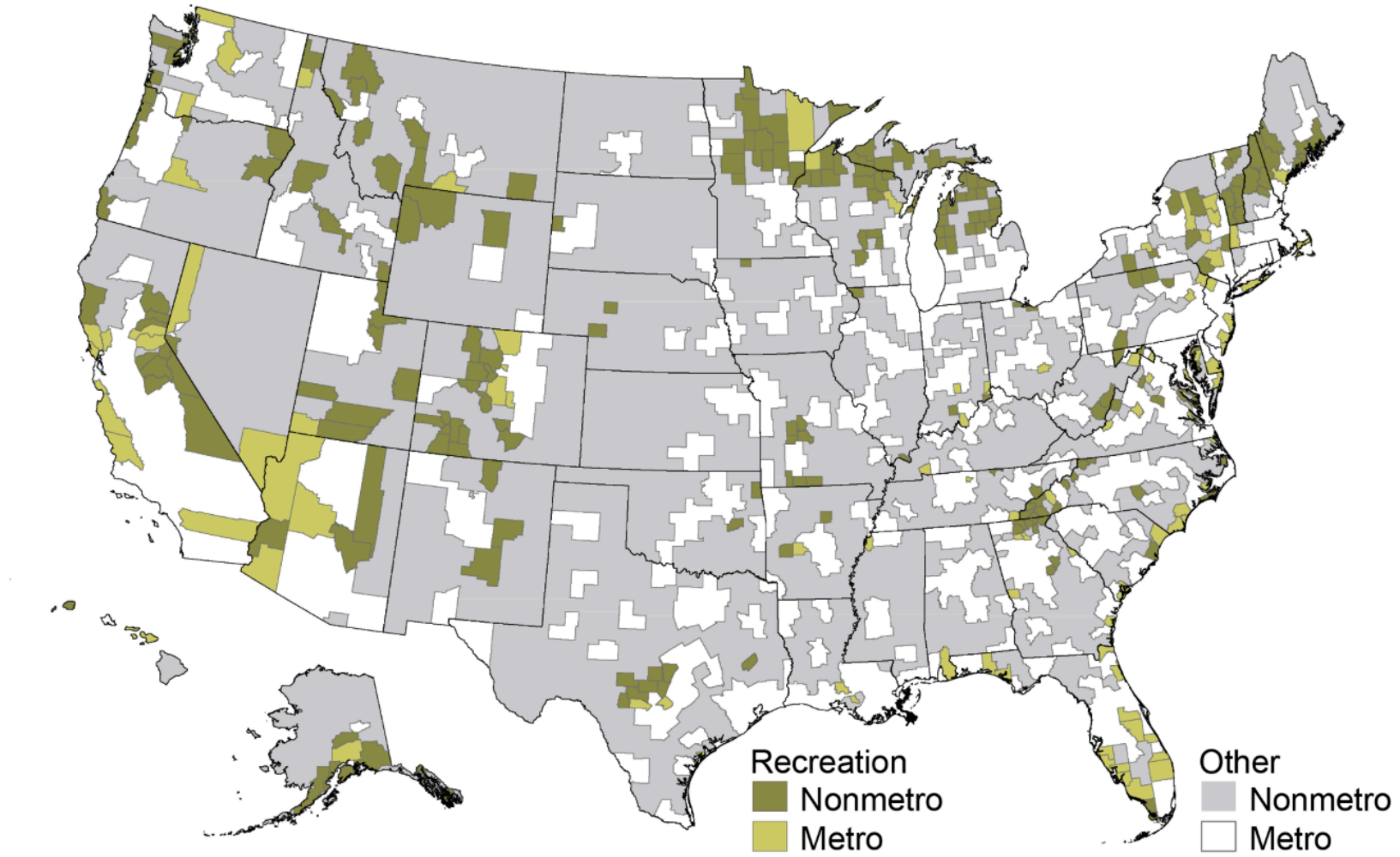
- Growth in recreation value-added has been double that of U.S. GDP in 3 of last 4 years: $373.7 bn. total in 2016[1]
- About twice the value of farming, forestry and fisheries (caveat)
- China: Tourist spending in 2016 of $250 bn world-wide, up 5-fold from 2010*



*The Economist, 2018

NE RCRD

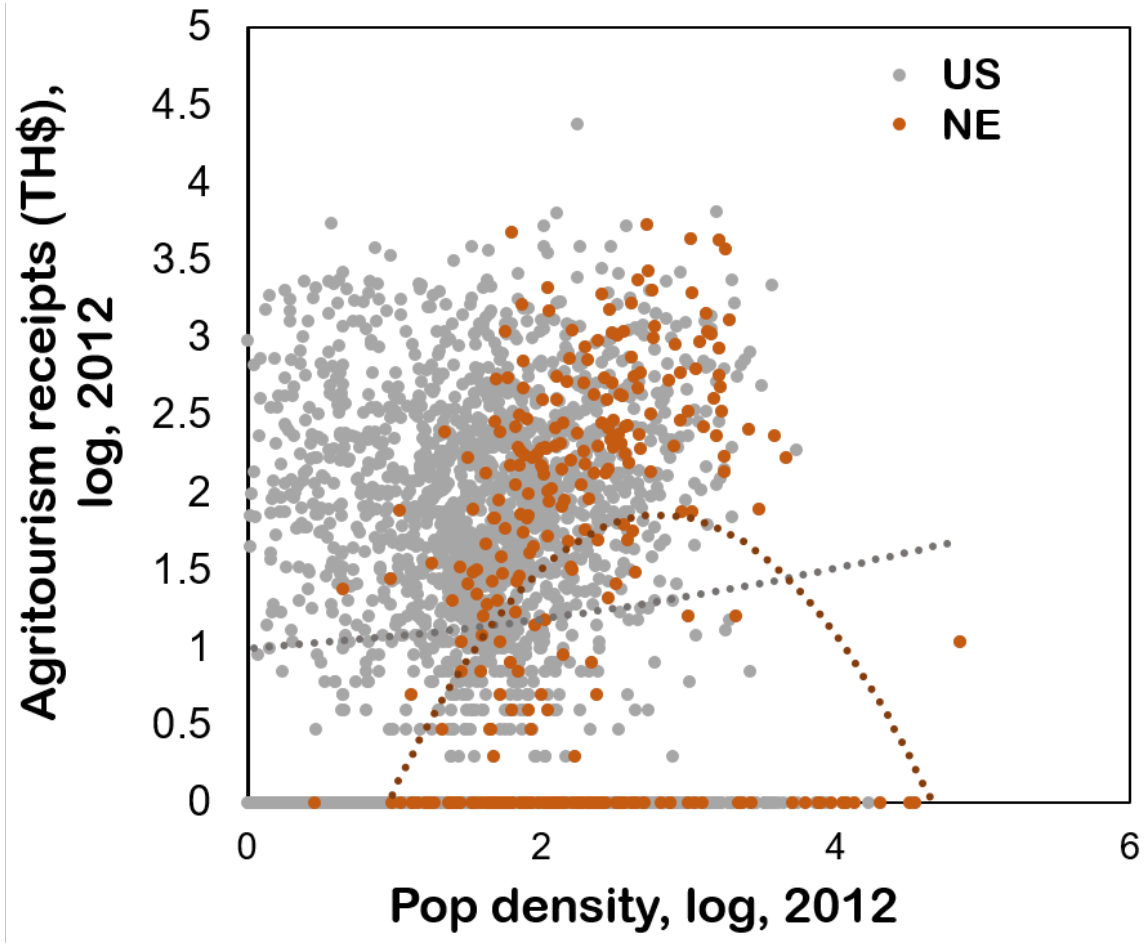
Recreation counties, 2015 edition



Recreation counties determined by a weighted index of three measures: 1) jobs; 2) earnings in the following: entertainment, recreation, accommodations, eating/drinking places, and real estate; and 3) the share of vacant housing units intended for seasonal/occasional use. Recreation counties are those with a score more than one deviation above the mean. Note that county boundaries are drawn for the recreation counties only. Map revised May 2017; see errata for details.
Source: USDA, Economic Research Service using data from Bureau of Economic Analysis and U.S. Census Bureau.

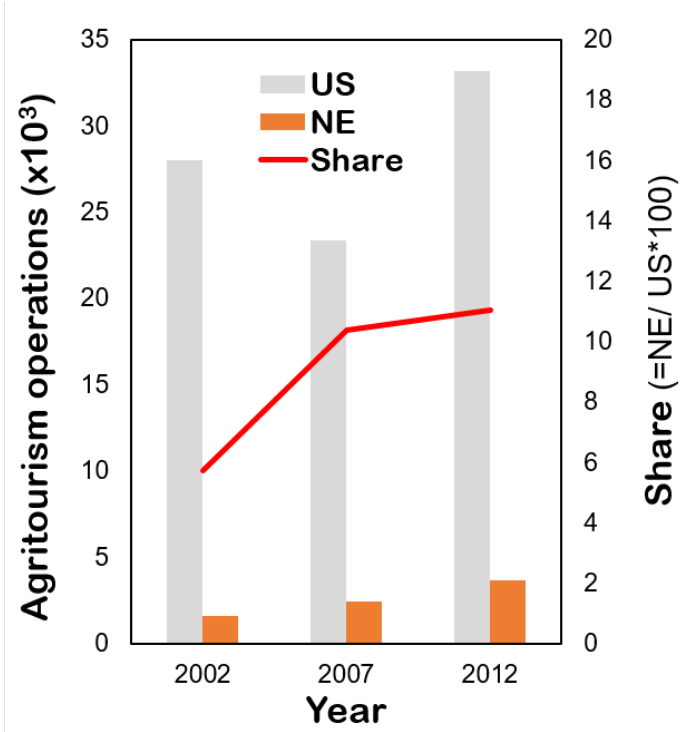
Agritourism receipts vs. pop density

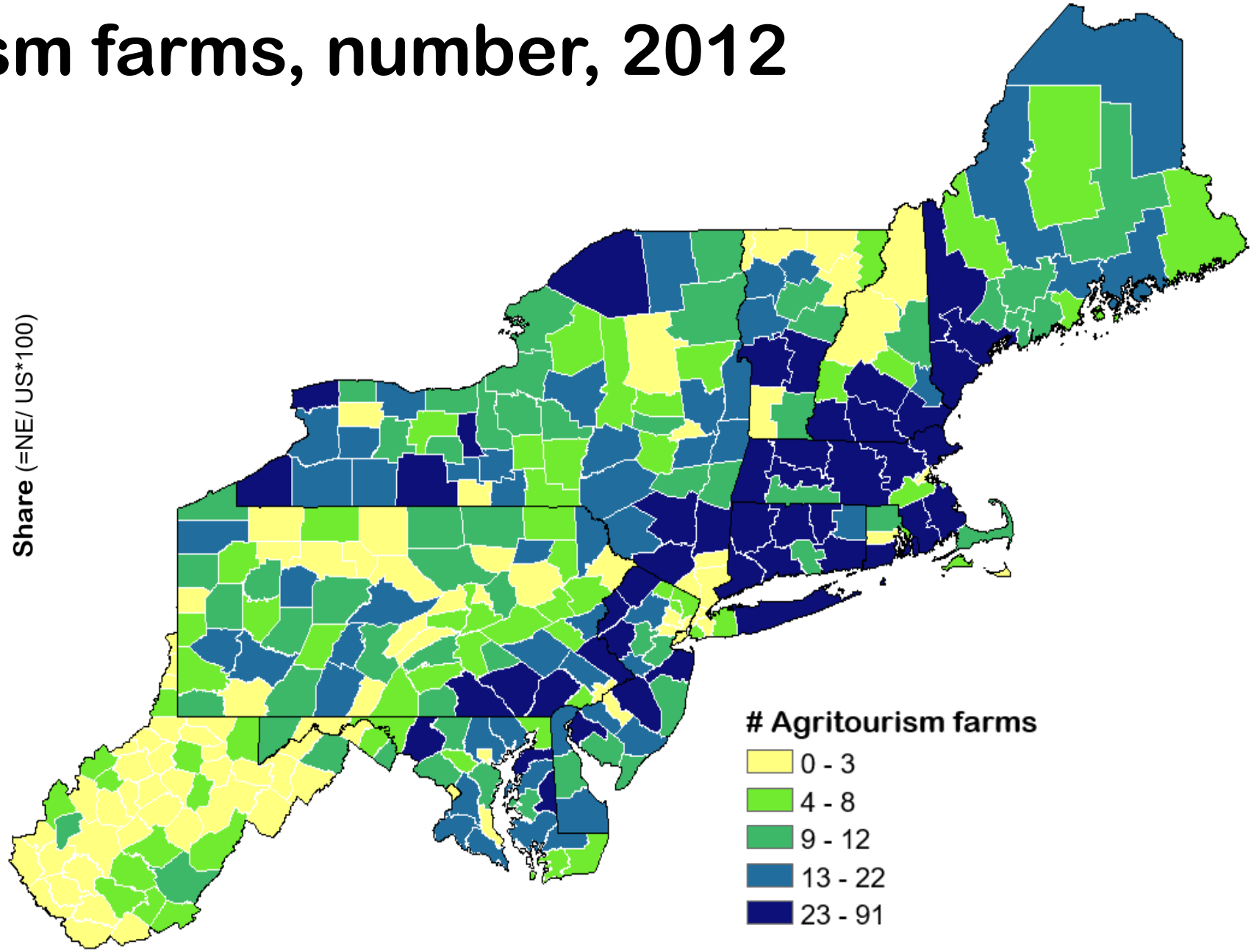
Agritourism activity tends to cluster on the rural-urban interface



Data source: U.S. Census, Population and Housing Unit Estimates. USDA ERS, Food Environment Atlas.

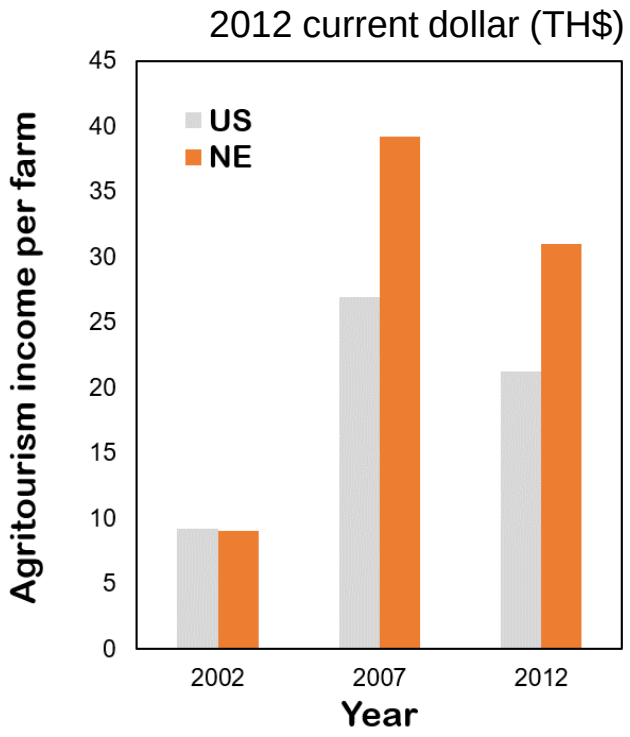
Agritourism farms, number, 2012

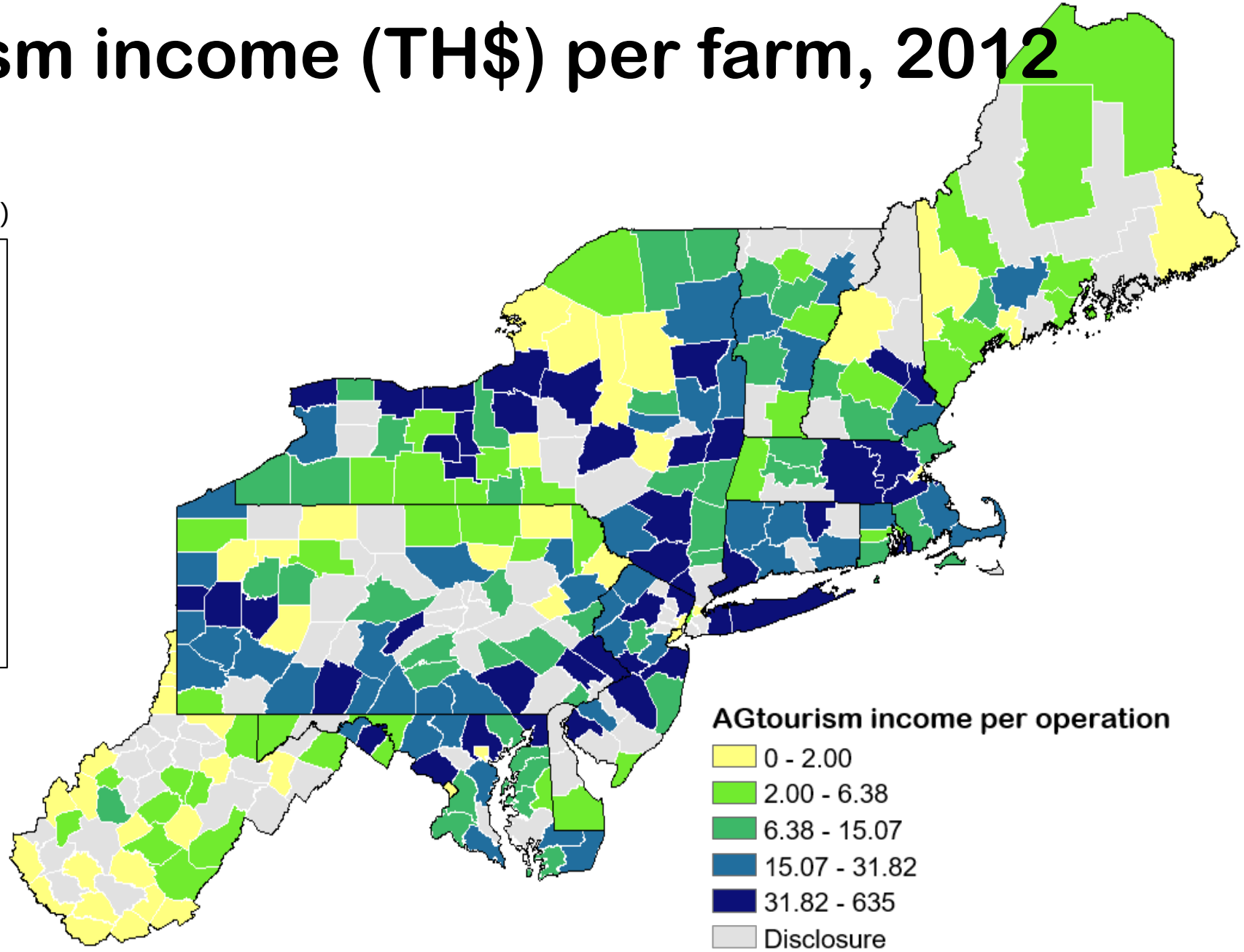




Data source: USDA National Agricultural Statistics Service, AG Census

Agritourism income (TH$) per farm, 2012



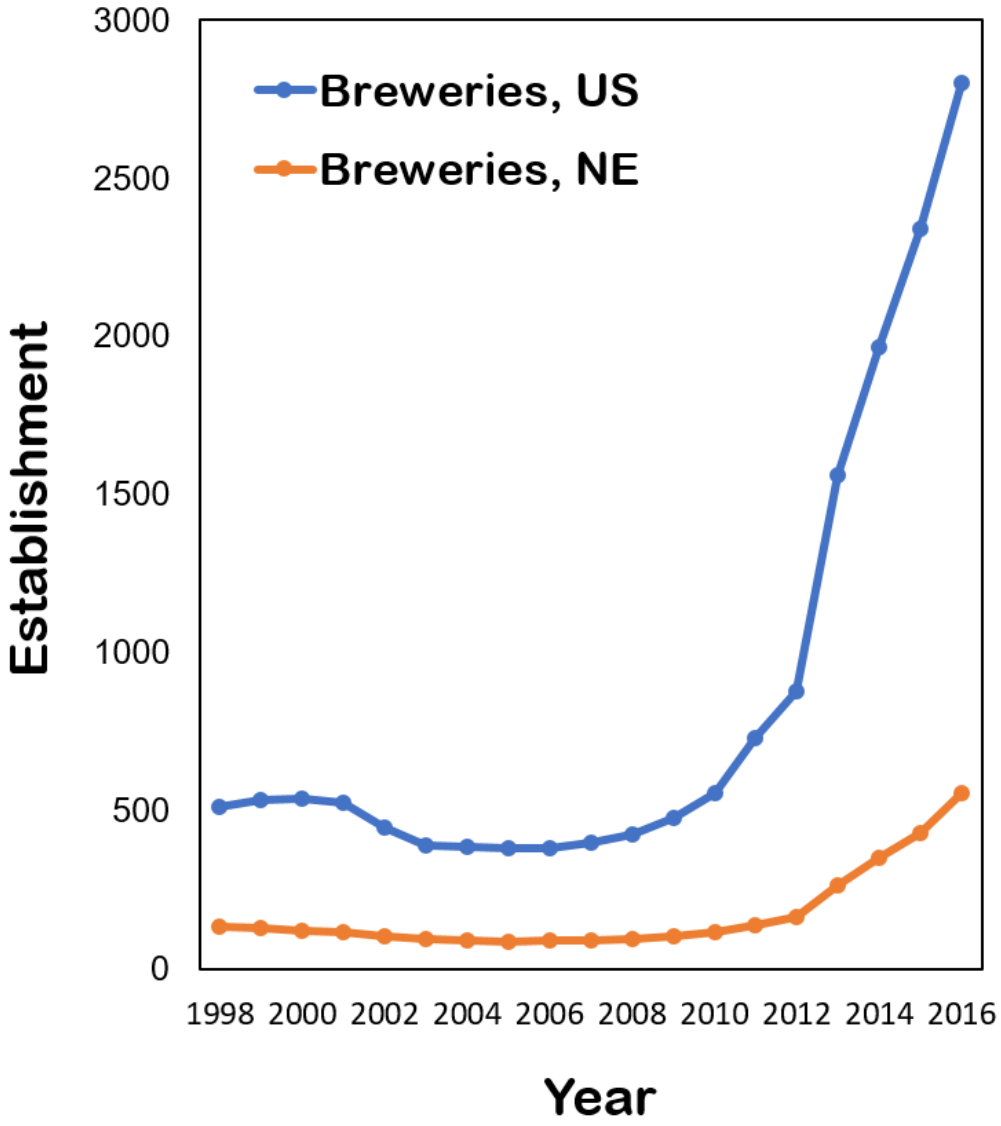


Data source: USDA National Agricultural Statistics Service, AG Census

Opportunities for LGUs

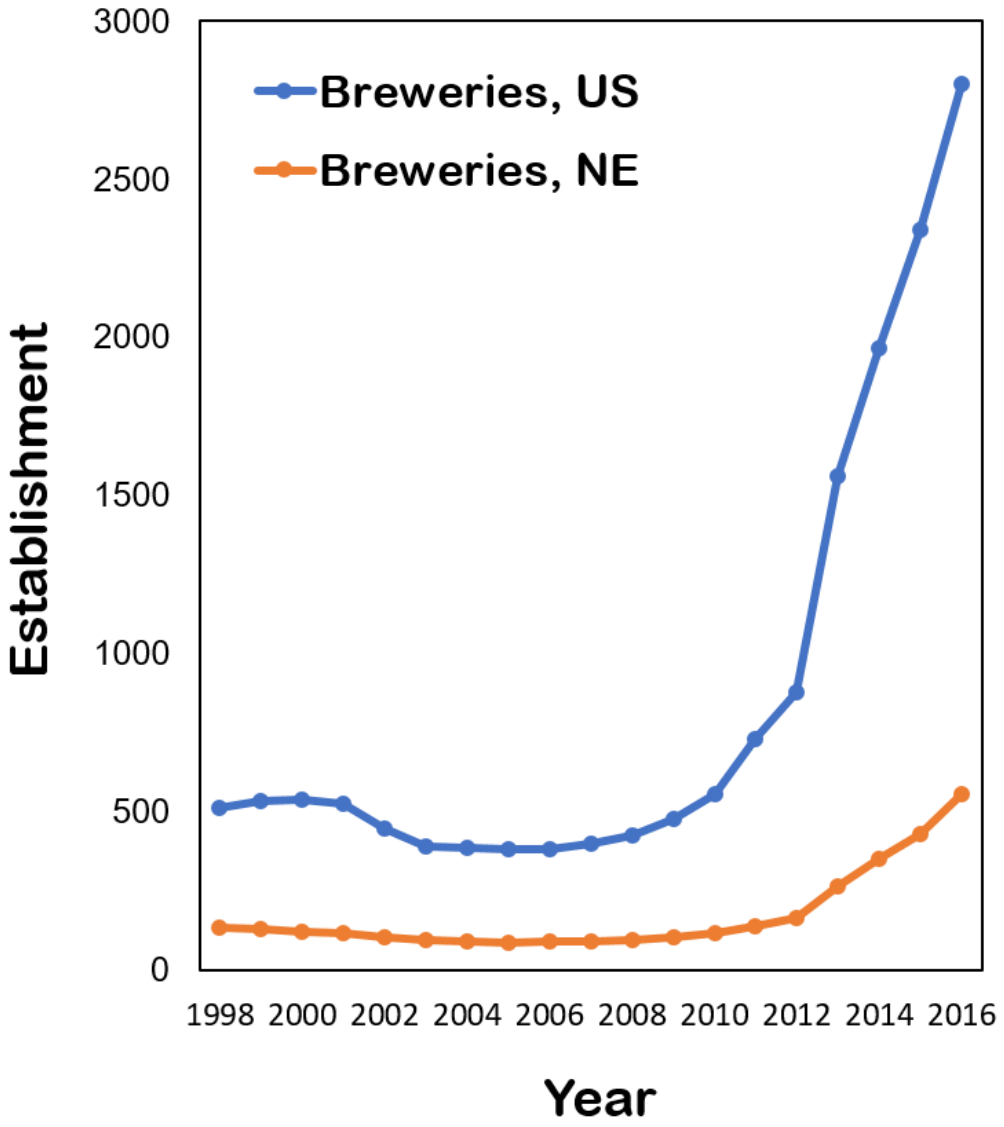
- Significant opportunities in agritourism
  - Agri-tourism best practices (L. Chase, UVM)
  - Prohibition trails (H. Manzo, PSU)
  - National Extension Tourism network (D. Arbogast, D. Eades, WVU)
- *Too much* tourism: Venice, New Zealand, etc.
  - Bar Harbor, ME (J. McConnon, T. Gabe, UME)
- ScotLAND of Food and Drink
- Food and Drink Wales: regional branding related to food
  - Food Tourism Toolkit
- Cooperation and competition
  - Public-private partnerships

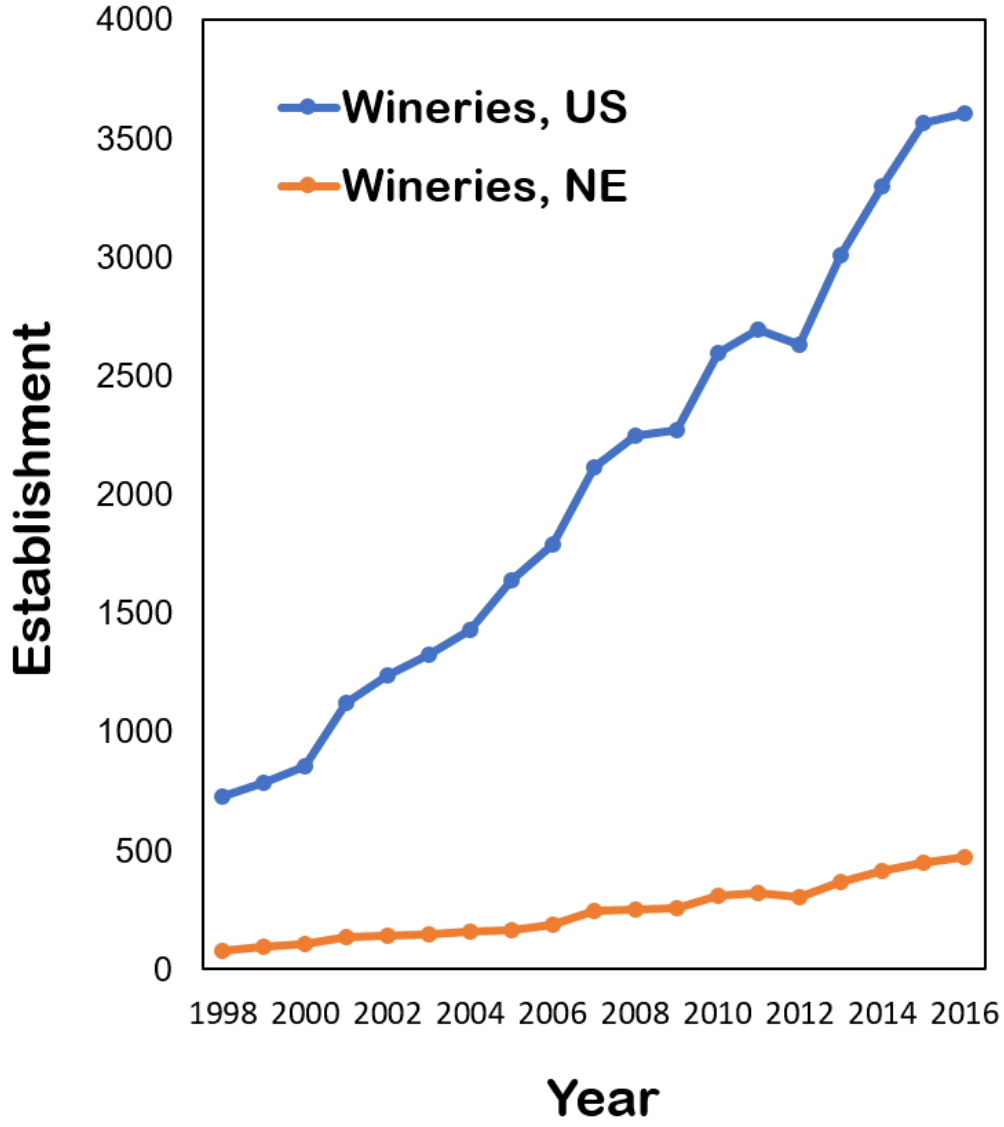
Breweries: Evolution 1998-2016



Data source: US Census, County Business Patterns, 1998-2016

Breweries and Wineries: Evolution 1998-2016



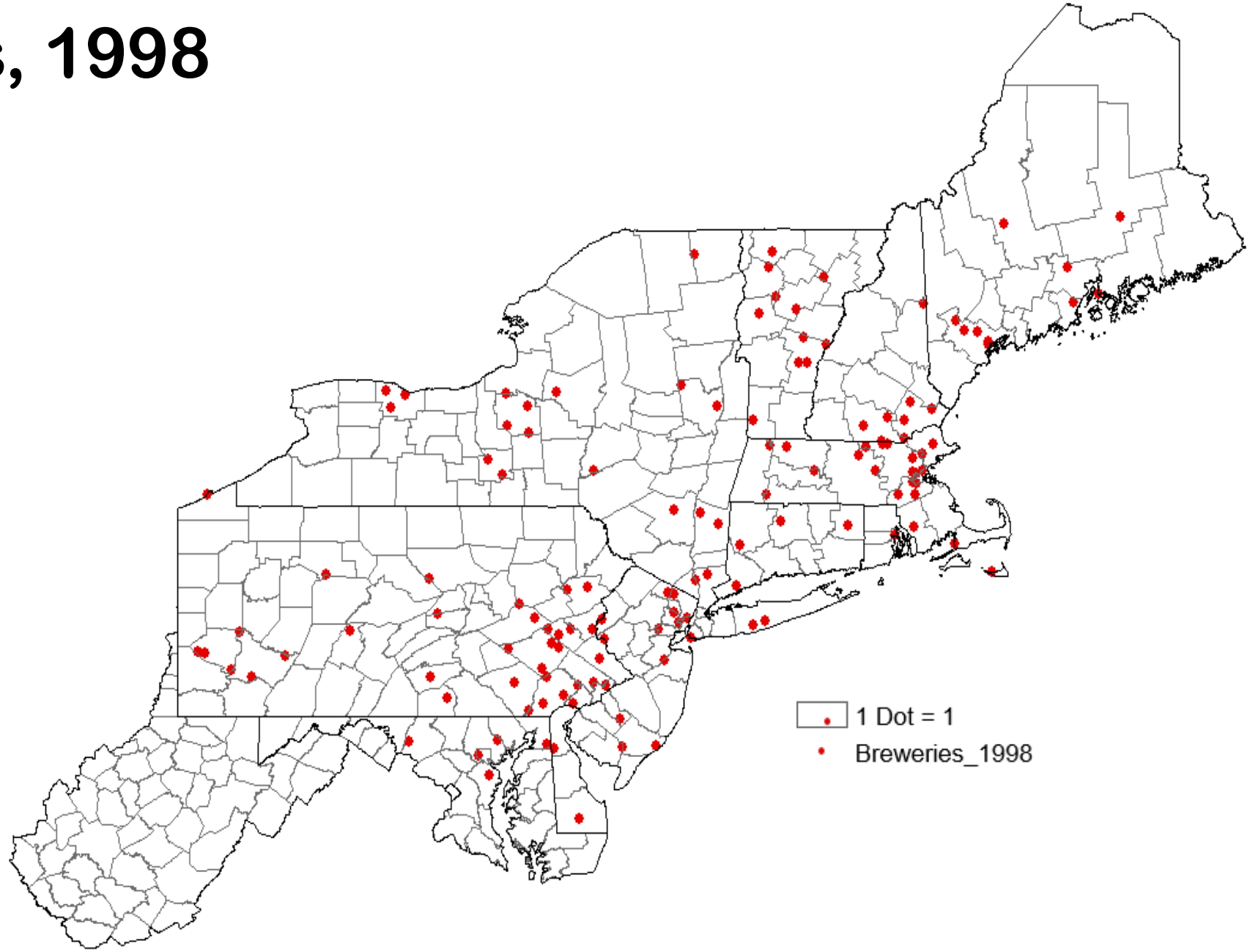


Data source: US Census, County Business Patterns, 1998-2016

Breweries, 1998

- Each dot is a firm
- 132 Breweries

Image: University of Vermont

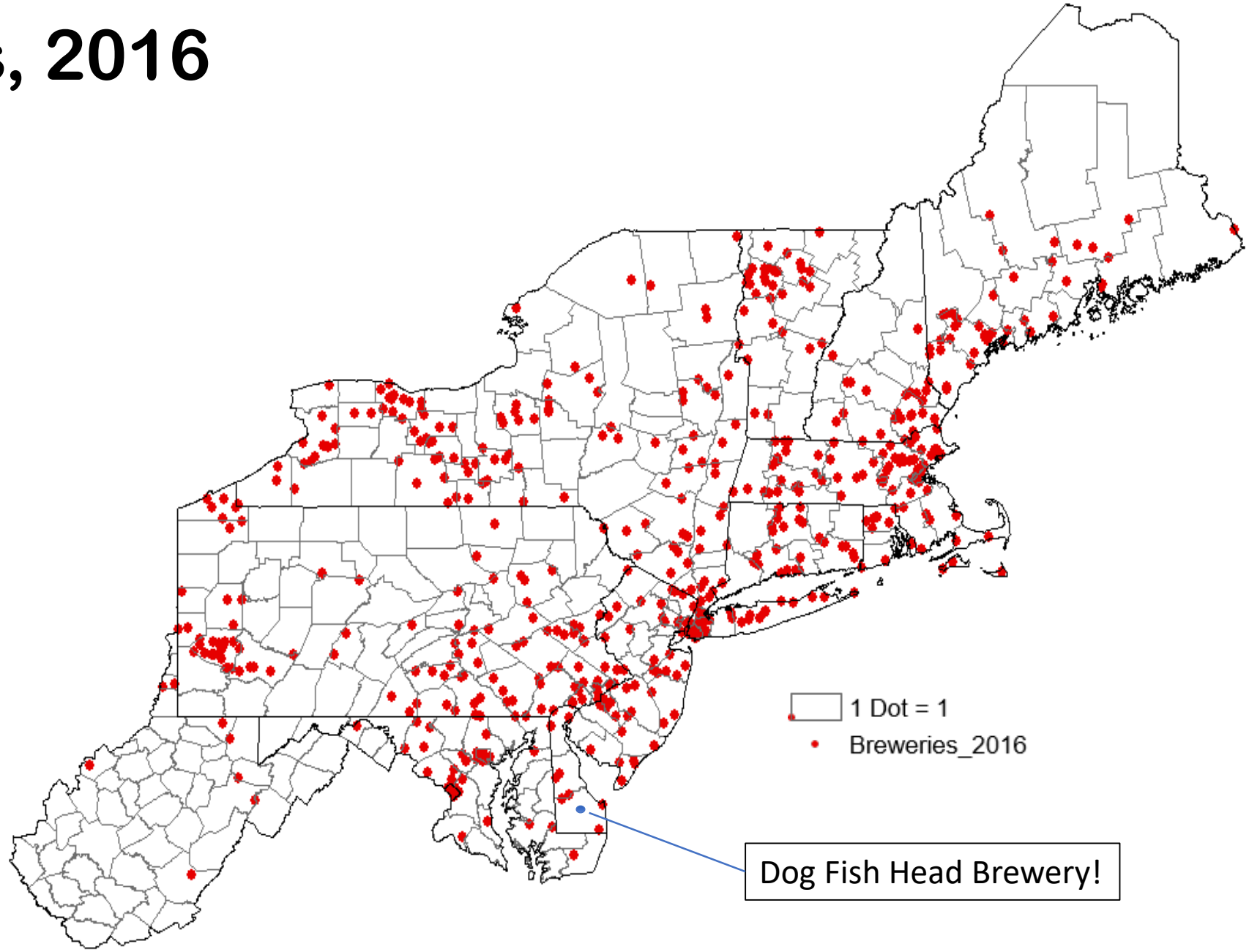


Data source: U.S. Census, County Business Patterns, 1998

Breweries, 2016

- Each dot is a firm
- 554 Breweries

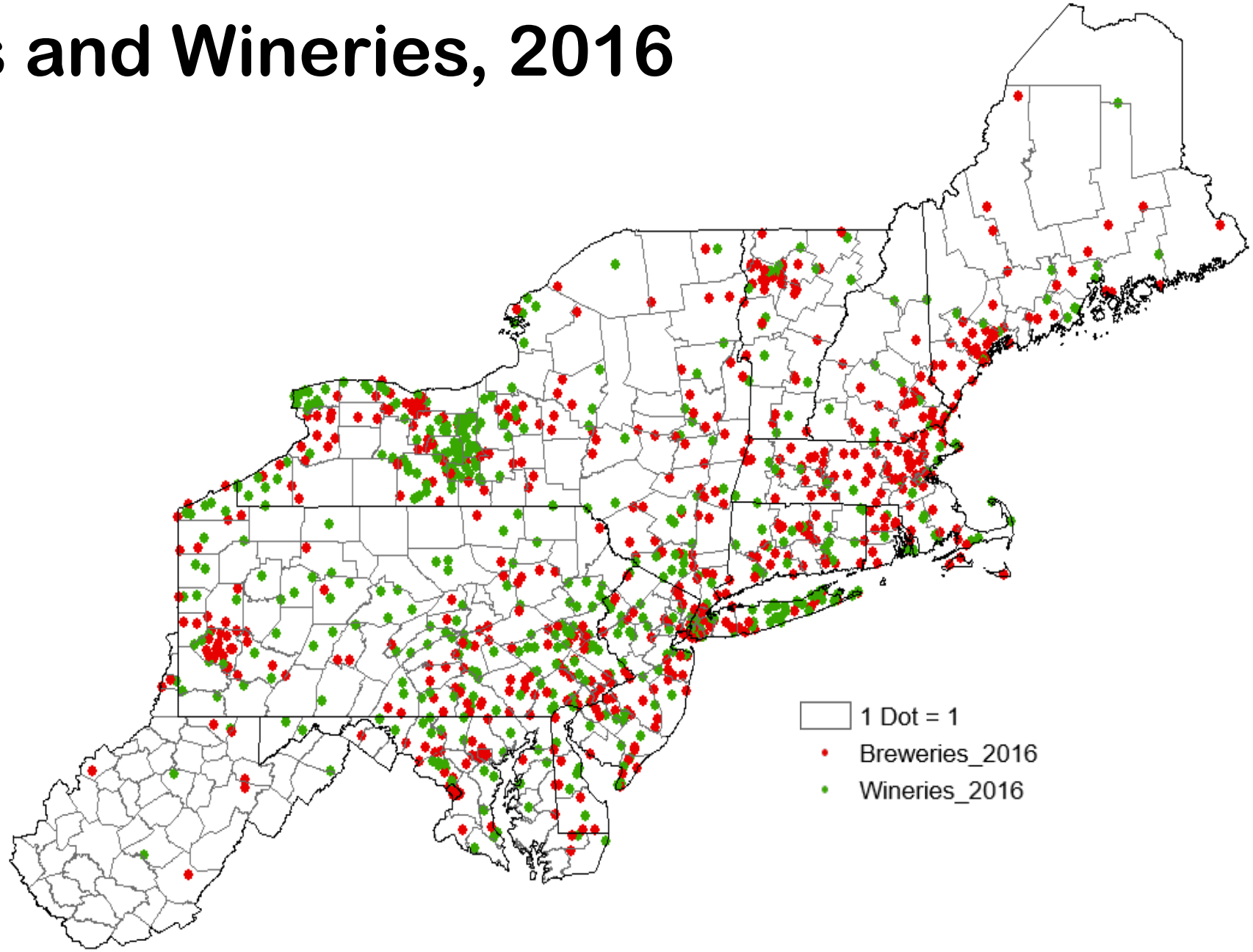
Image: University of Vermont



Data source: U.S. Census, County Business Patterns, 2016

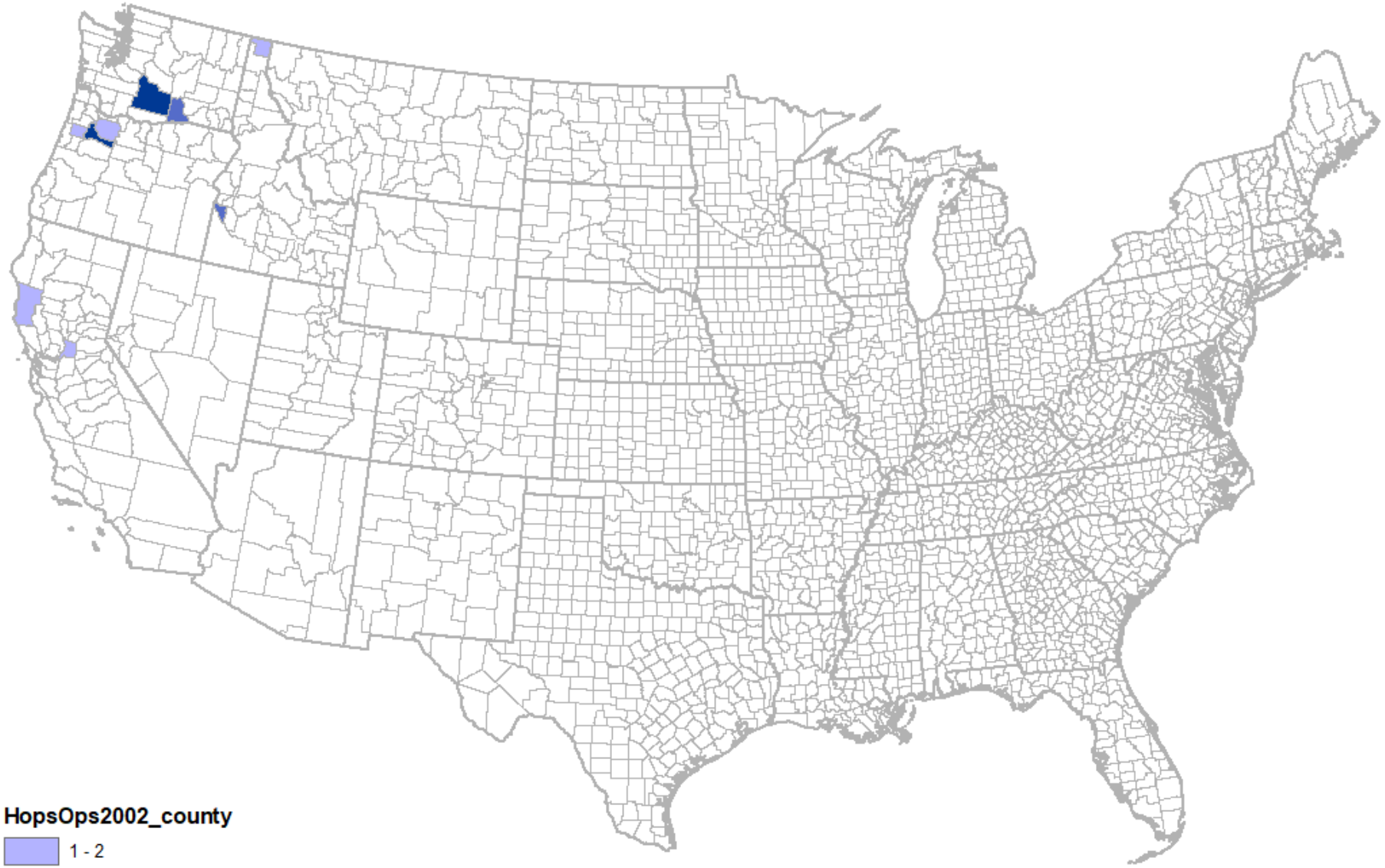
Breweries and Wineries, 2016

- 554 Breweries
- 417 Wineries



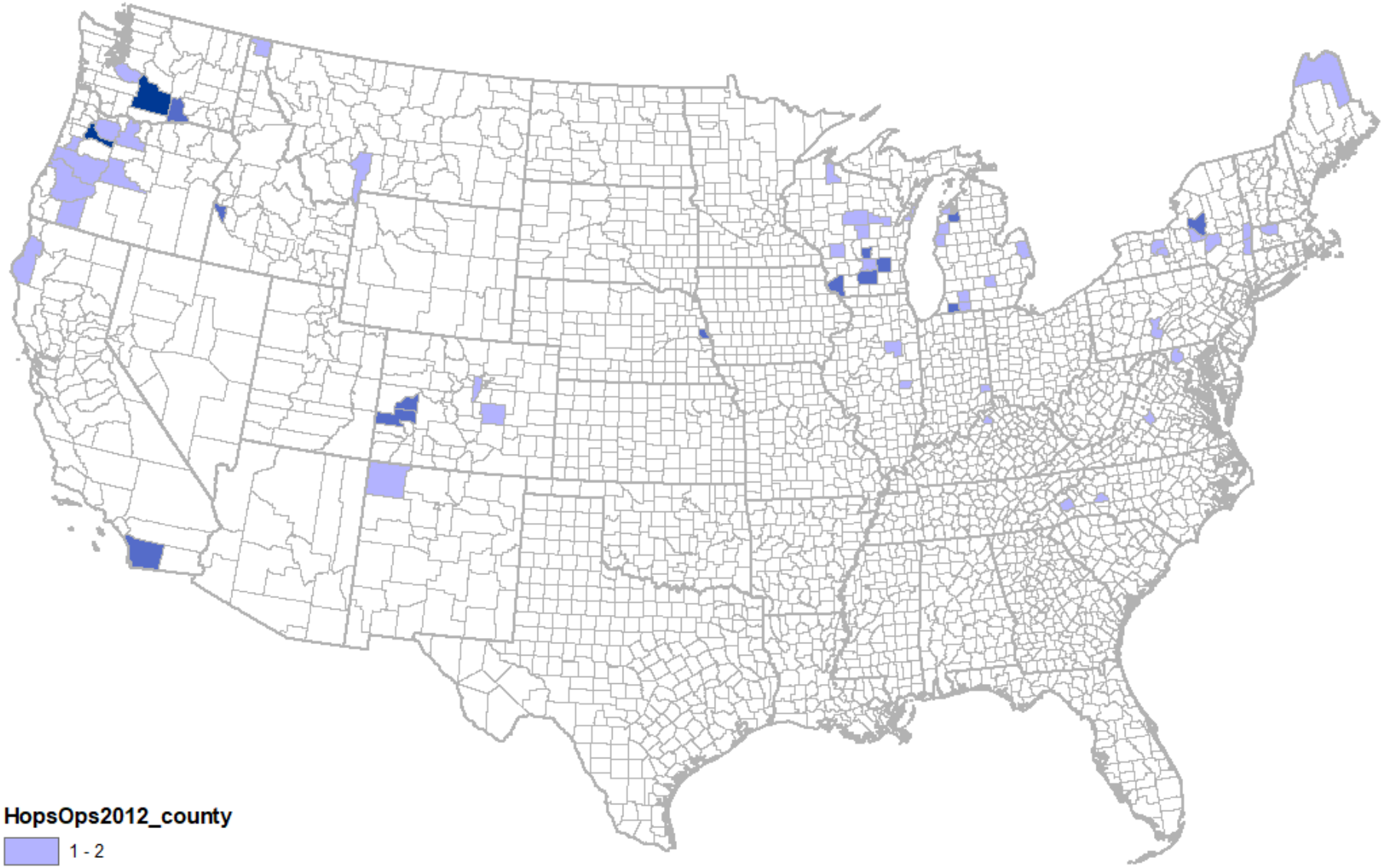
Data source: U.S. Census, County Business Patterns, 2016

Hops-Growing operations (2002) are…



With thanks to N. Reid, Cleveland State University, Ohio

…moving (back?) to the Midwest, Northeast: 2012 data



With thanks to Neil Reid, Cleveland State University, Ohio

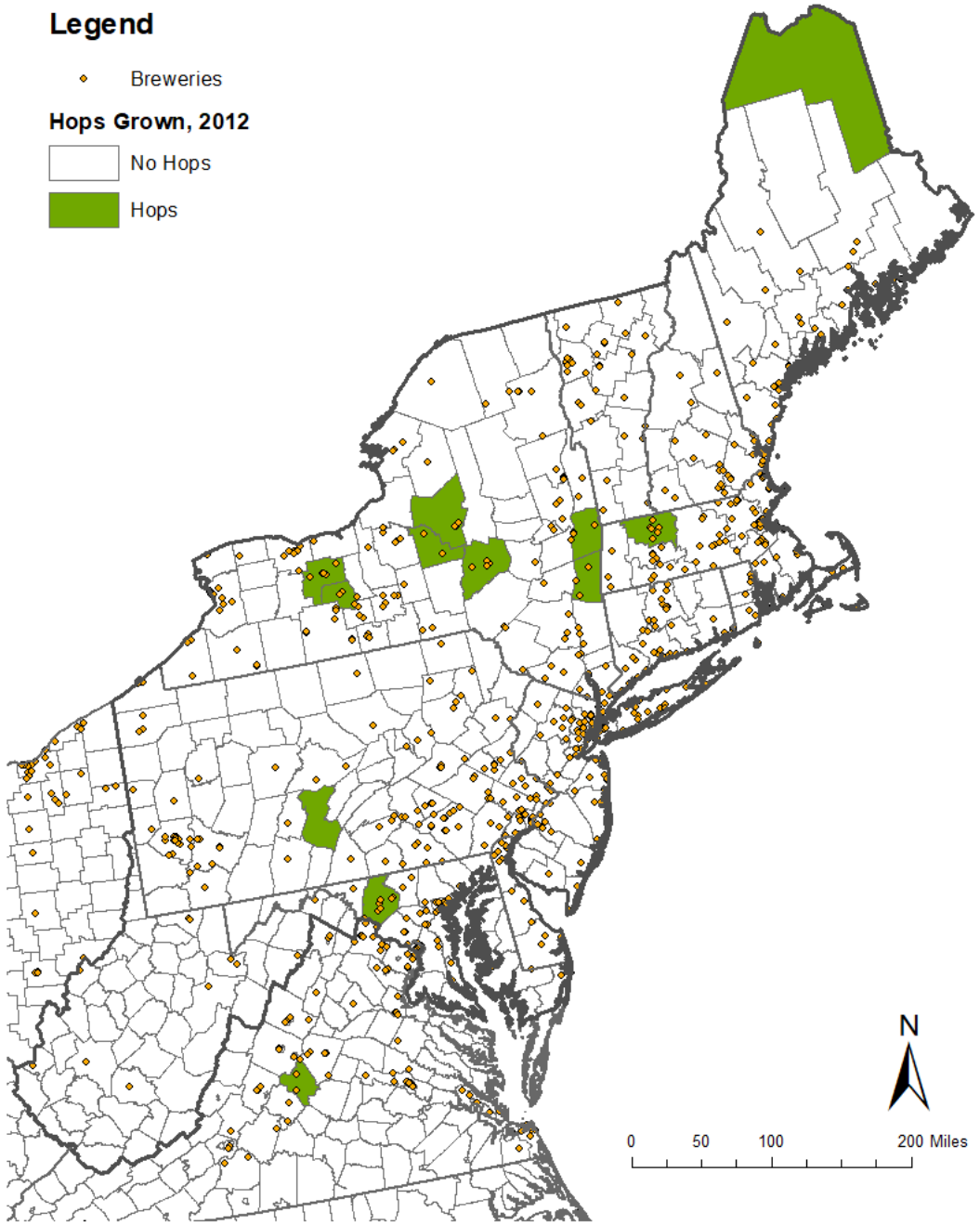
Locations of Hops areas and breweries

Opportunities for developing branded local supply chains?

University research on climate adaptation, profitability, other*

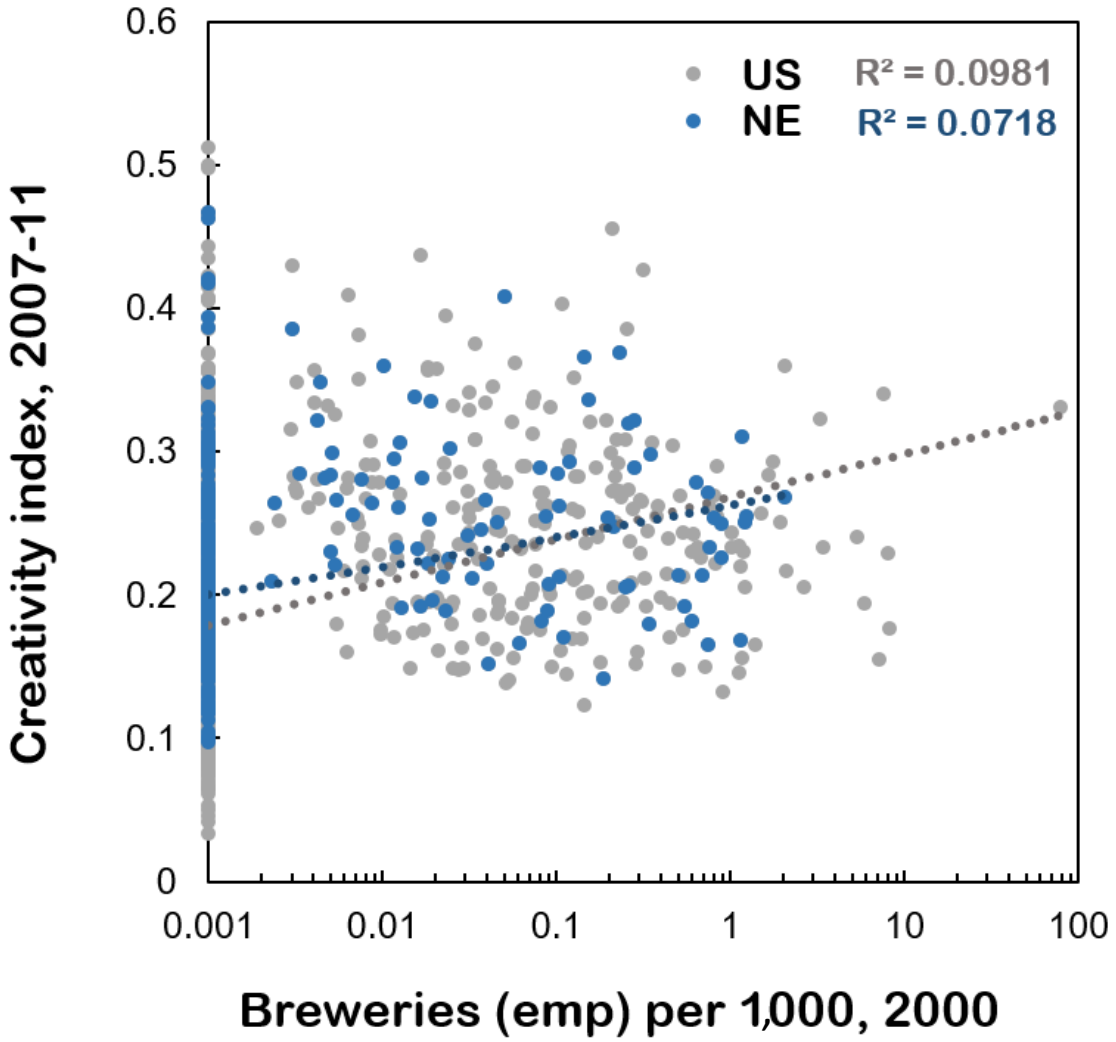
*N. Reid, 2017 NARSC presentation, Vancouver, CA

Ag innovation clusters project: P. Gottlieb, Rutgers U.



- Are places with breweries more creative (innovative) or do creative places have breweries?

Creativity index vs. 2000 breweries per capita



Data source: U.S. Census, County Business Patterns. USDA ERS Cerative Class County Code

Key Federal Collaborations

"Report to the President of the United States from the Task Force on Agriculture and Rural Prosperity," Secretary Sonny Purdue, Chair. October 21, 2017

Call to Action:

- Achieving e-Connectivity for Rural America
- Improving Quality of Life
- Supporting a Rural Workforce
- Harnessing Technological Innovation
- Developing the Rural Economy

nercrd.psu.edu

Acknowledgements

Special thanks to USDA-NIFA for funding of various grants, NERA for off-the-top regional funding, Penn State College of Ag Sciences for support, and to NERCRD staff…

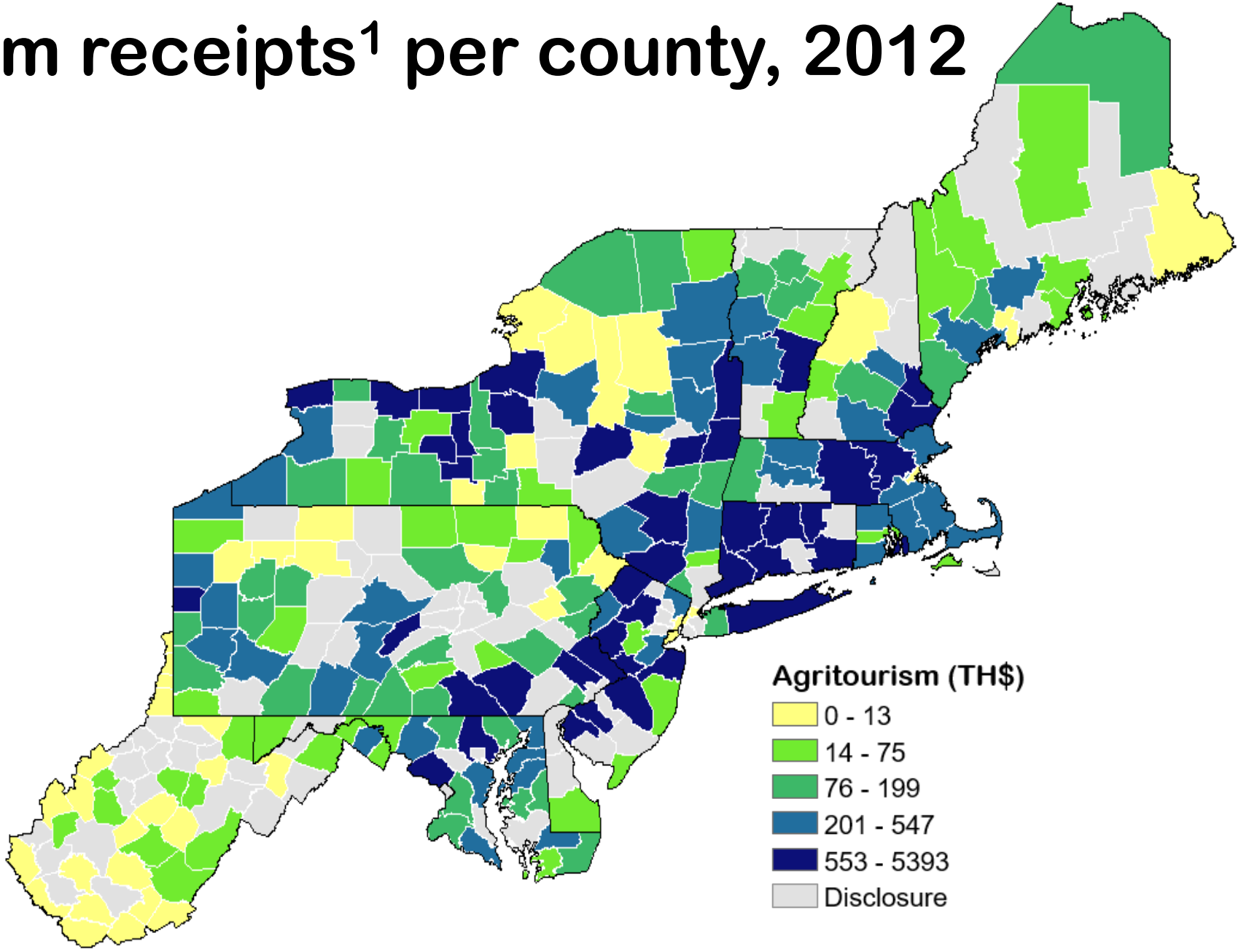
- Dr. Yicheol Han
- Sarah Denny
- Dr. Elizabeth Dobis
- Heather Manzo
- Kristen Devlin

Thank You!

sgoetz@psu.edu

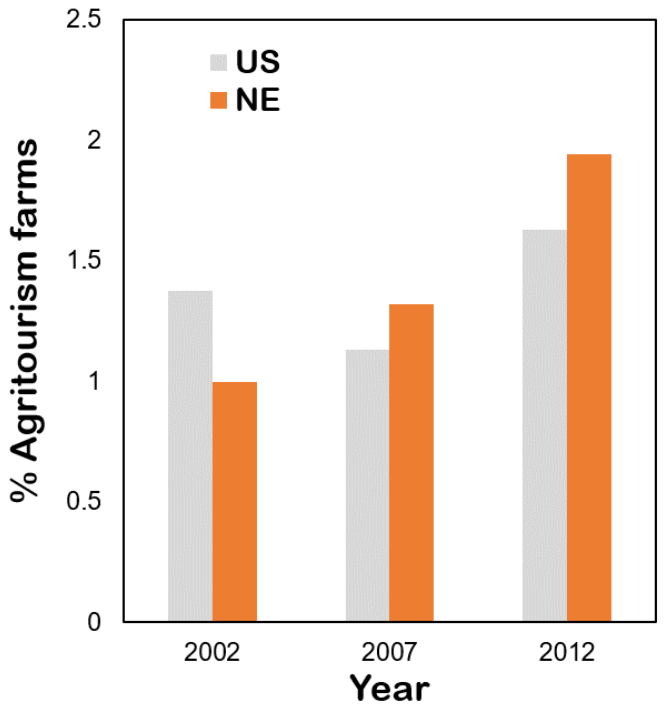
nercrd.psu.edu

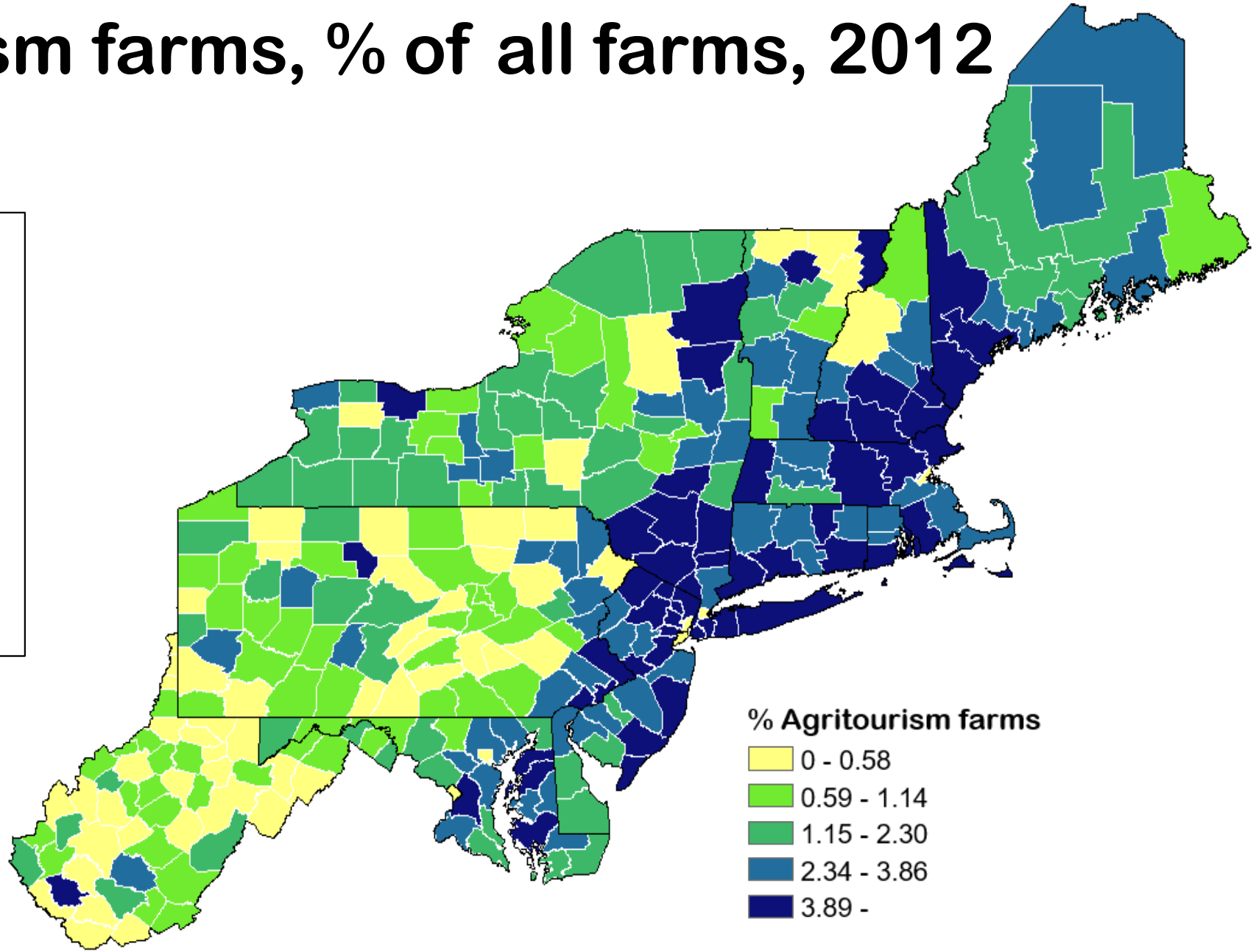
Agritourism receipts[1] per county, 2012



[1]Includes recreational services; Data source: USDA National Agricultural Statistics Service, AG Census

Agritourism farms, % of all farms, 2012

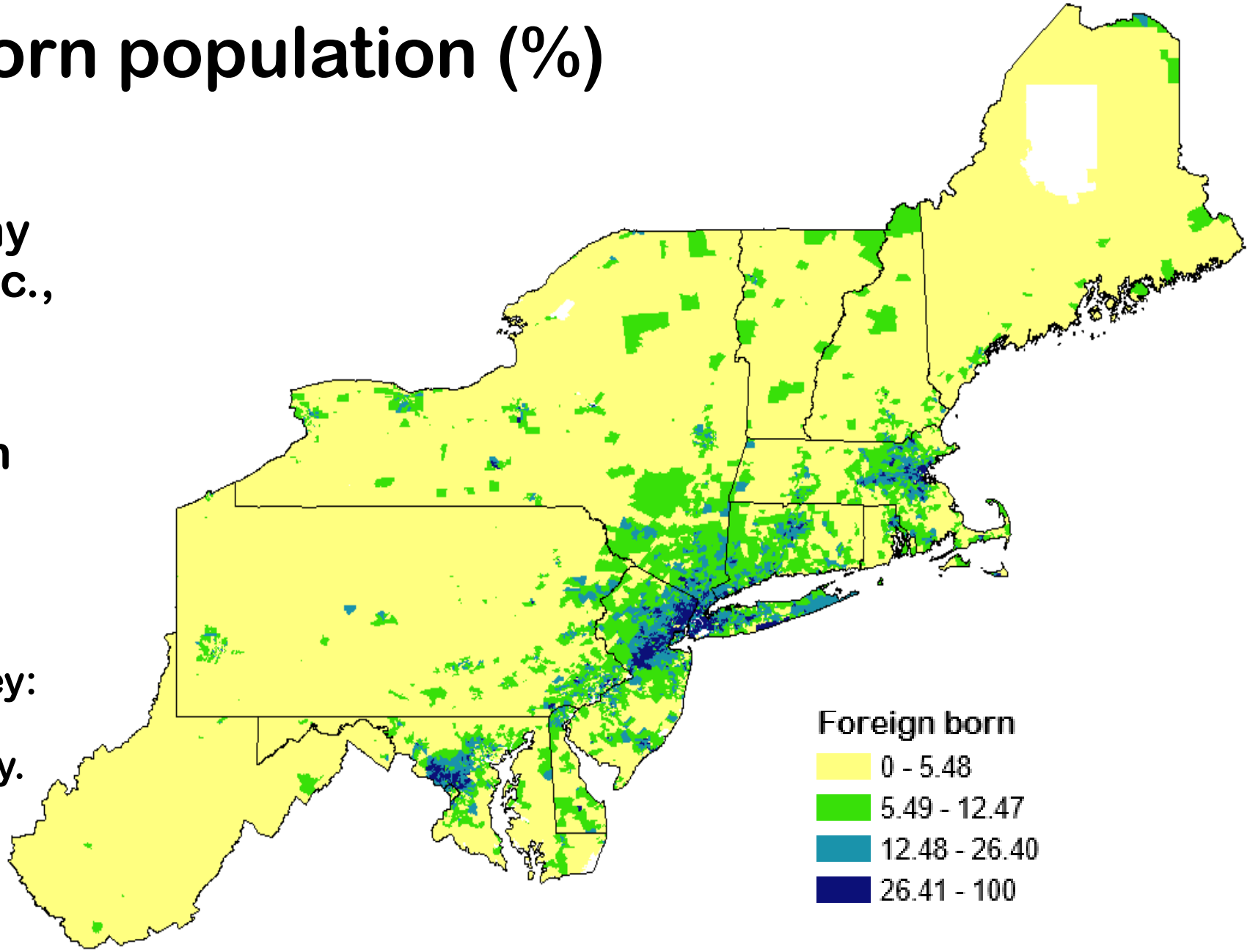




% farms = # agritourism farms / (# animal farms + # crop farms)* 100. Data source: USDA National Agricultural Statistics Service, AG Census

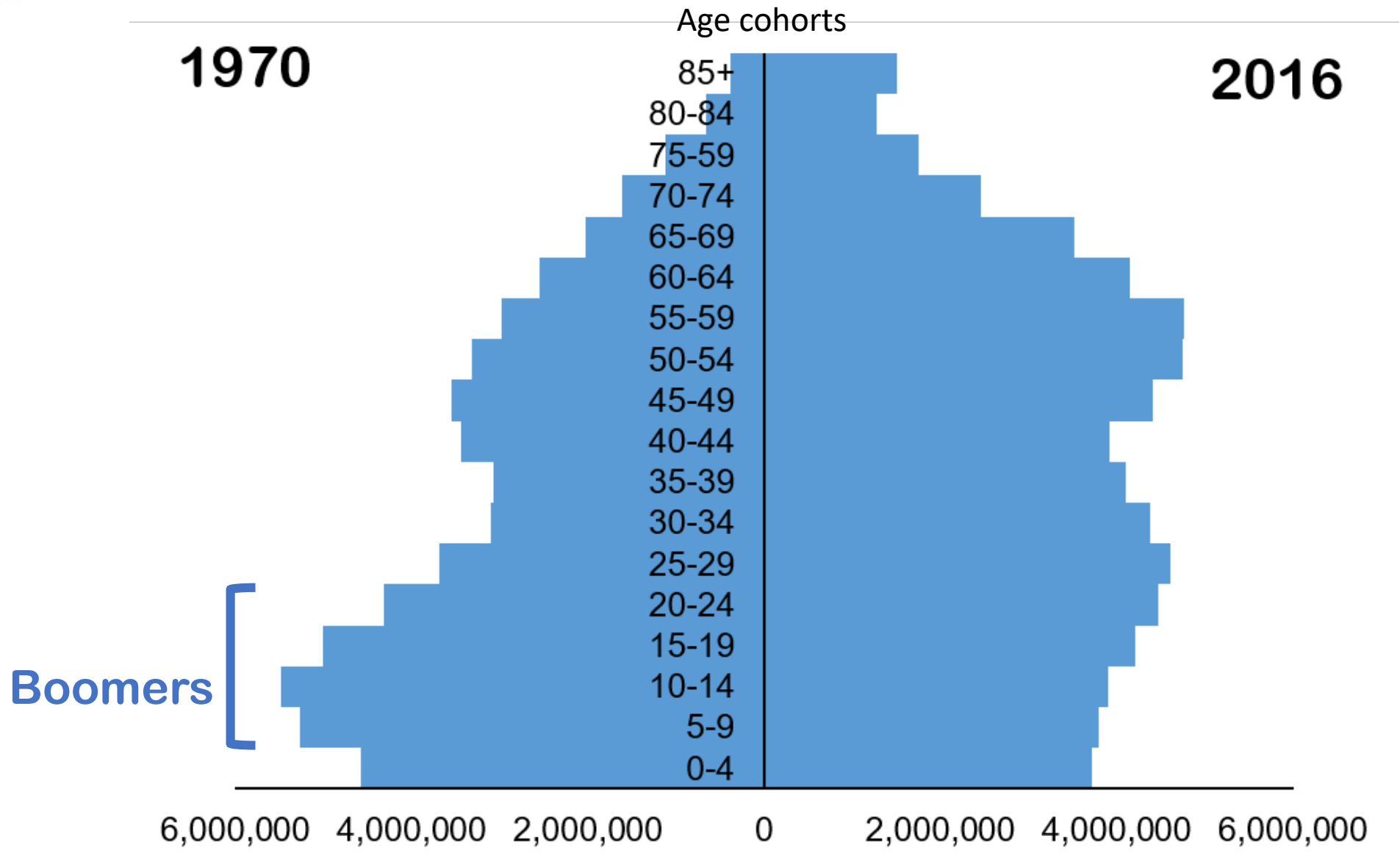
Foreign-born population (%)

- Foreign-born hold many entry level jobs, in agric., manufacturing, construction
- But they are locating in cities
- May need help with integration
  - PSU Ext in LeHigh Valley: fostering relations with the Hispanic community.



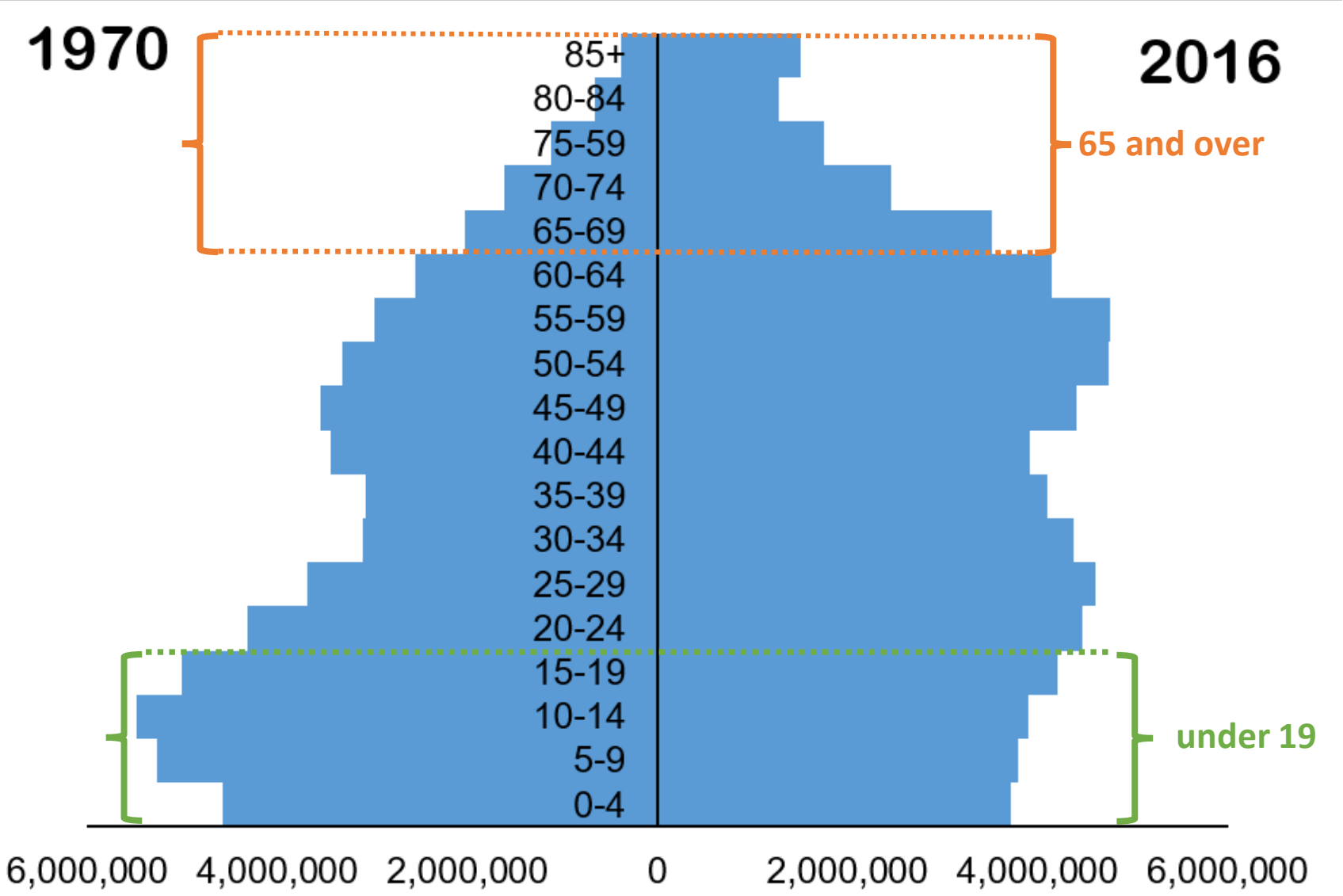
Data source: U.S. Census, American Community Survey 2012-2016

Population pyramid, the Northeast



Data source: U.S. Census, Population and Housing Unit Estimates

Population pyramid, the Northeast



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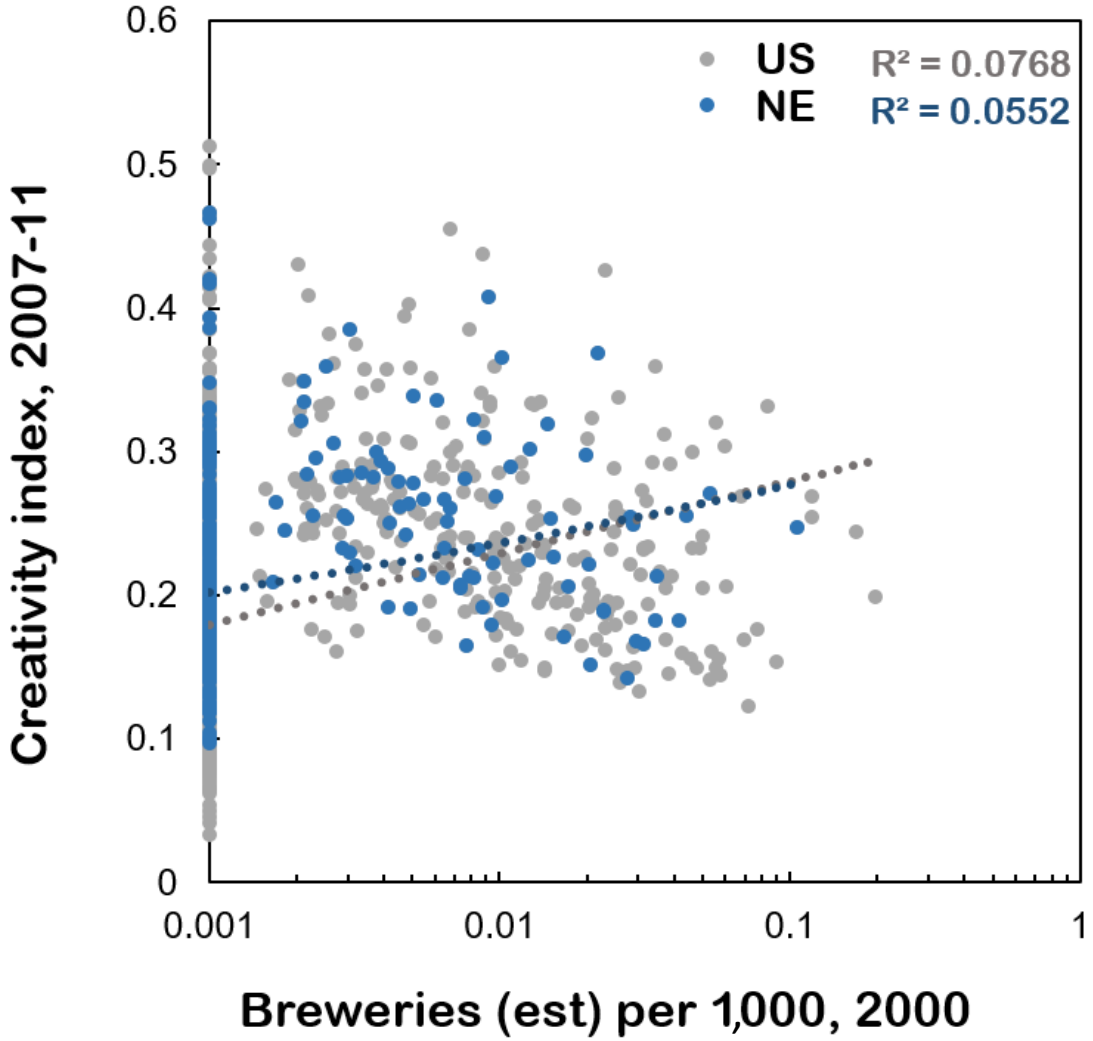
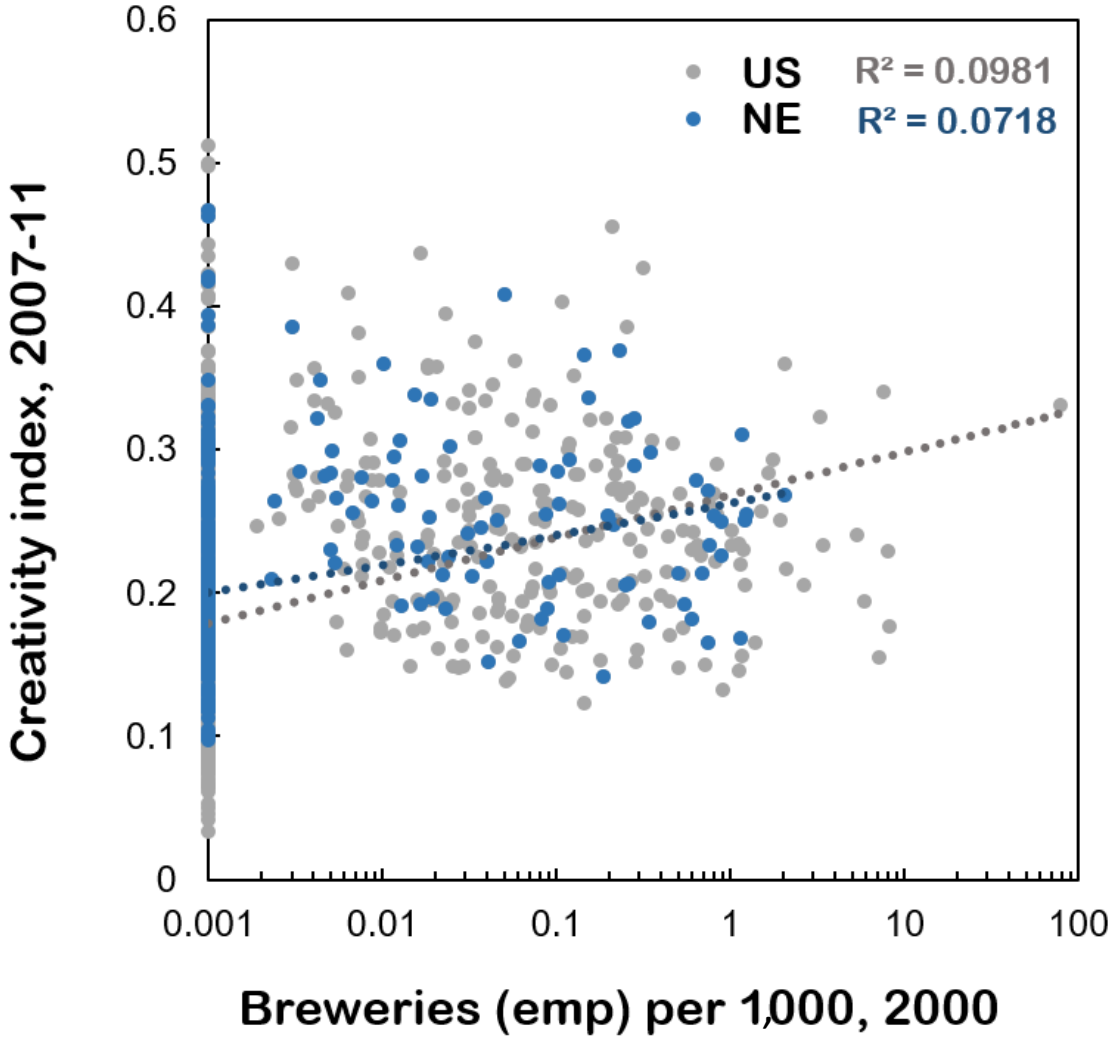
Creativity index vs. 2000 breweries per capita





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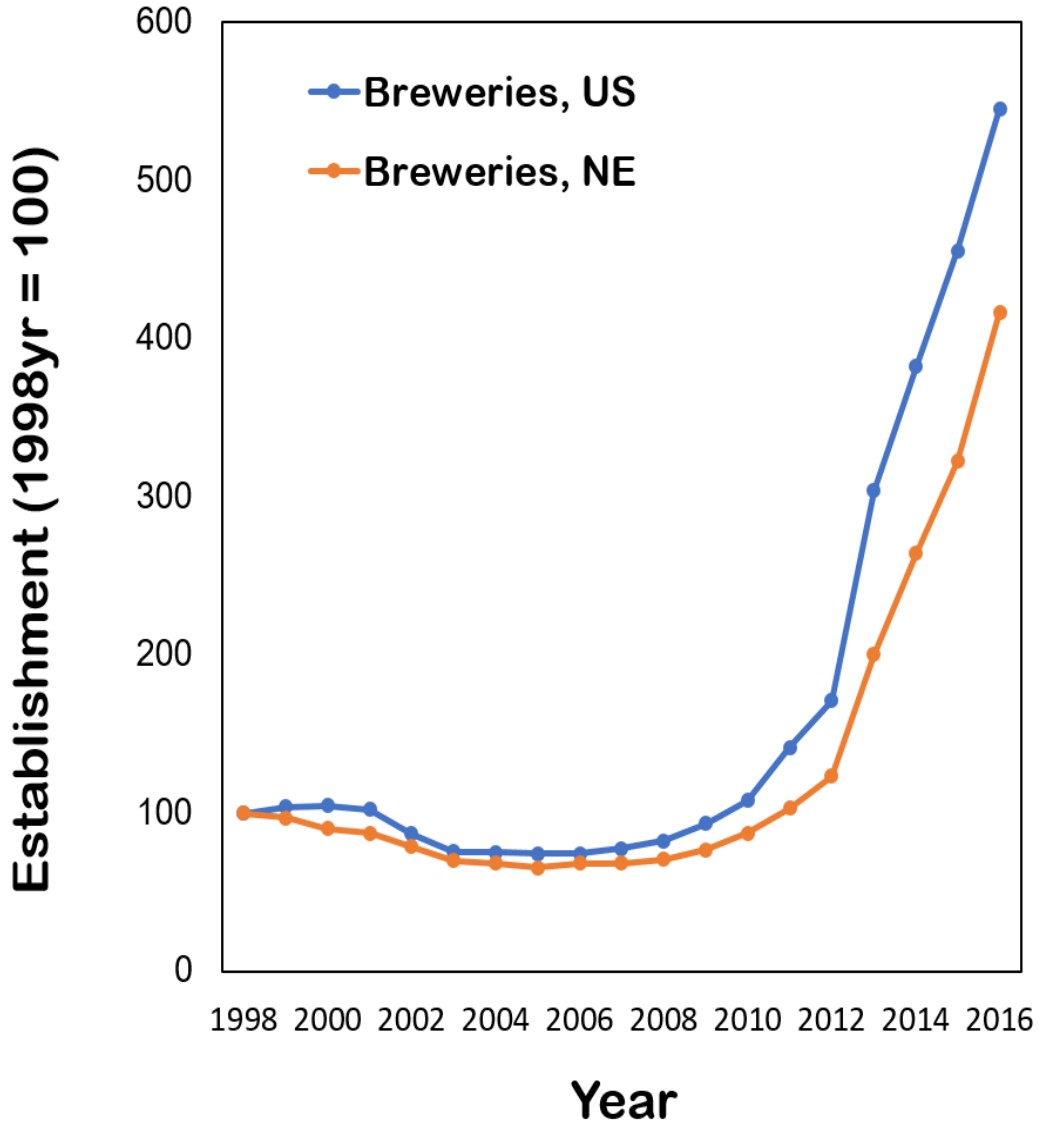
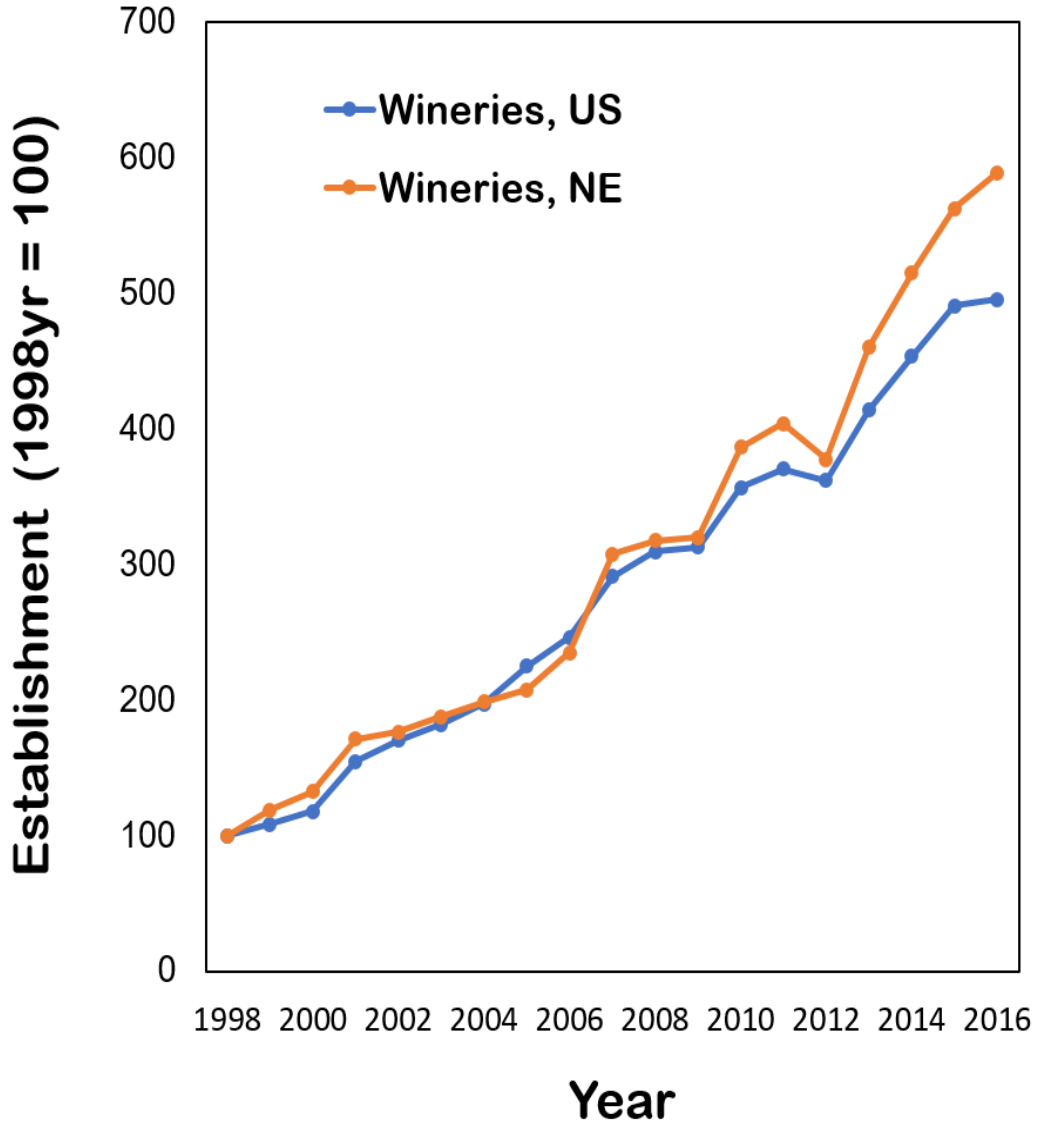
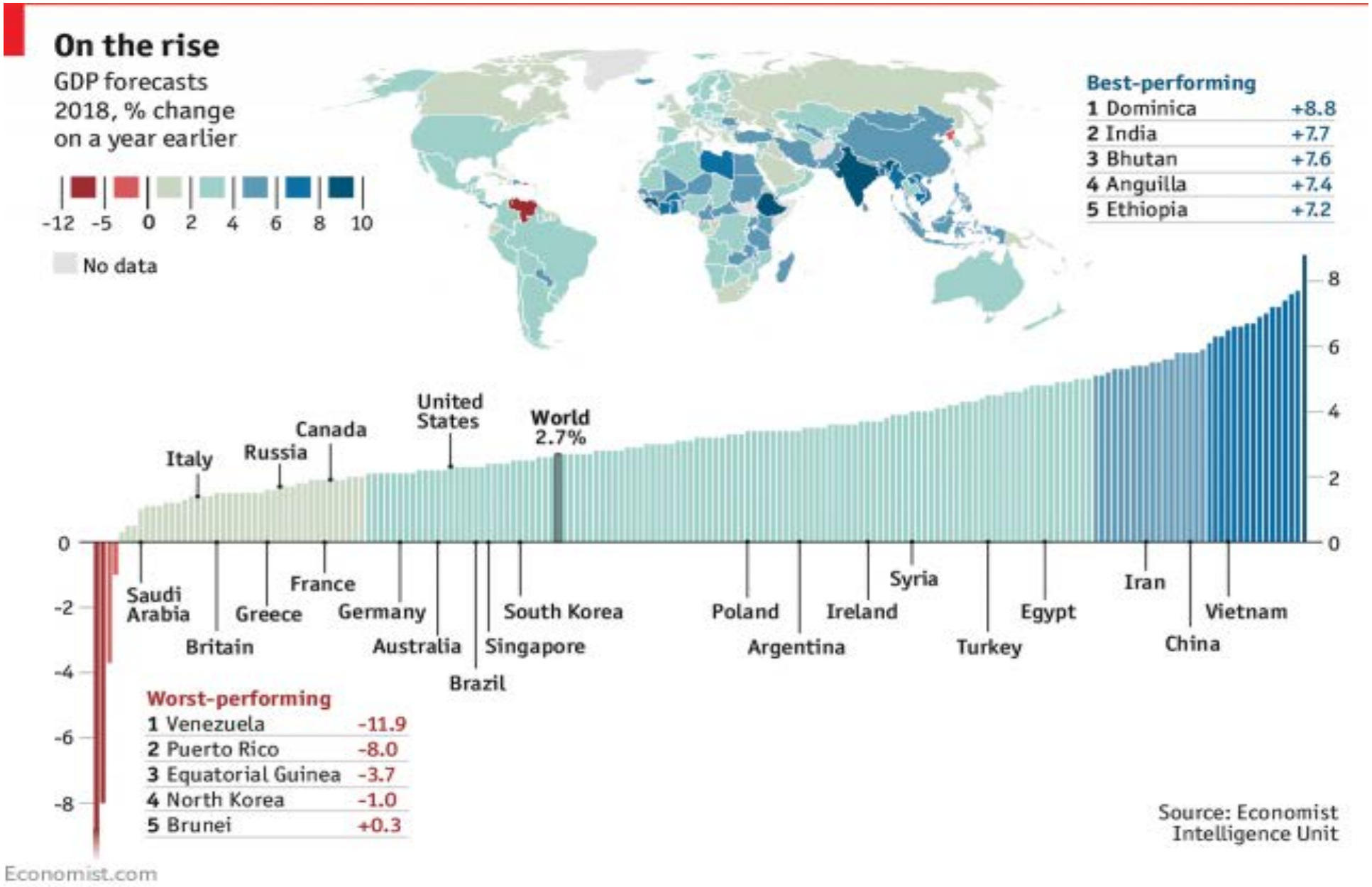
Breweries and Wineries





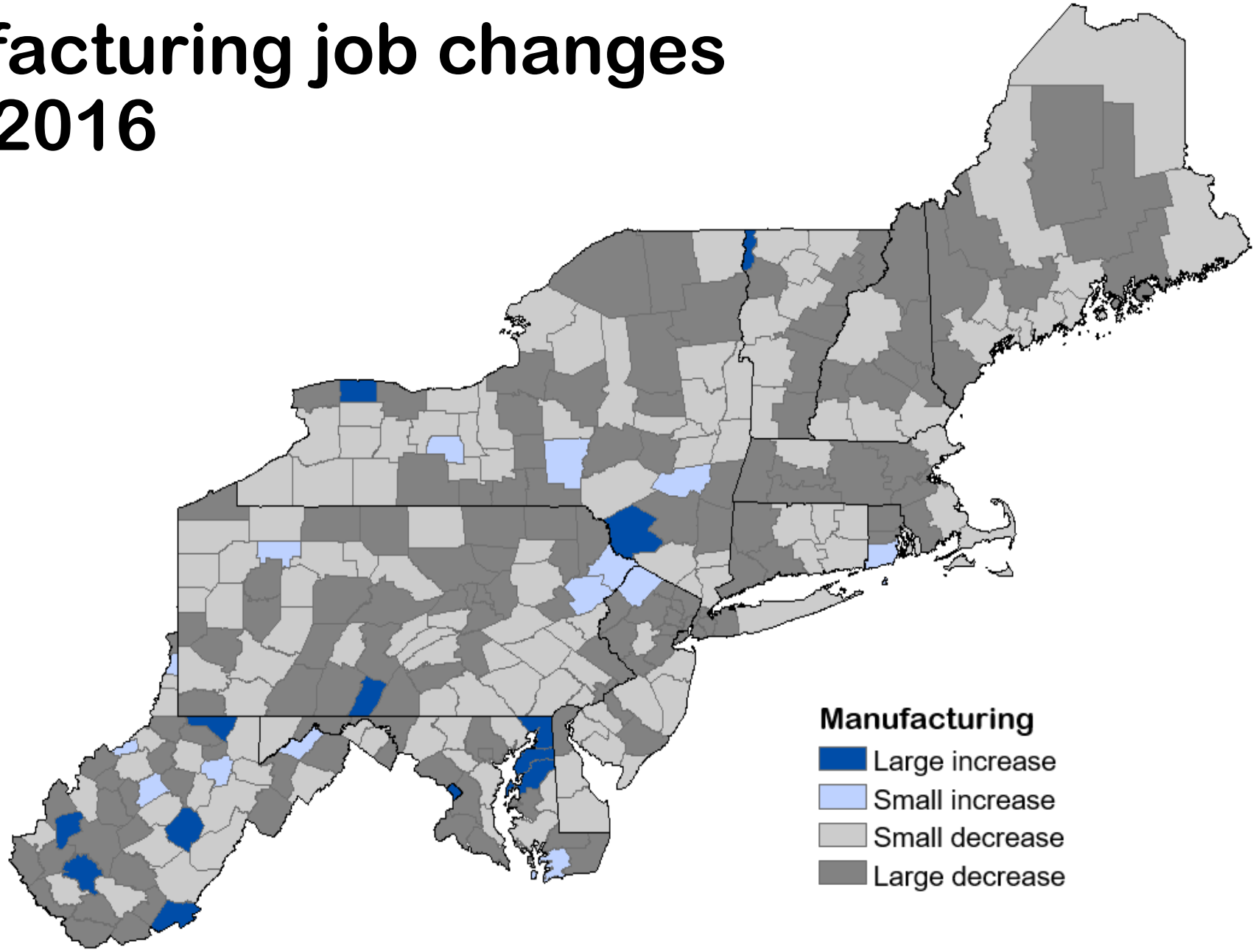
Data source: US Census, County Business Patterns, 1998-2016

The fastest-growing and -shrinking economies in 2018



https://www.economist.com/graphic-detail/2018/01/05/the-fastest-growing-and-shrinking-economies-in-2018

Manufacturing job changes 1998-2016



Data source: U.S. Census, County Business Patterns, 1998 and 2016

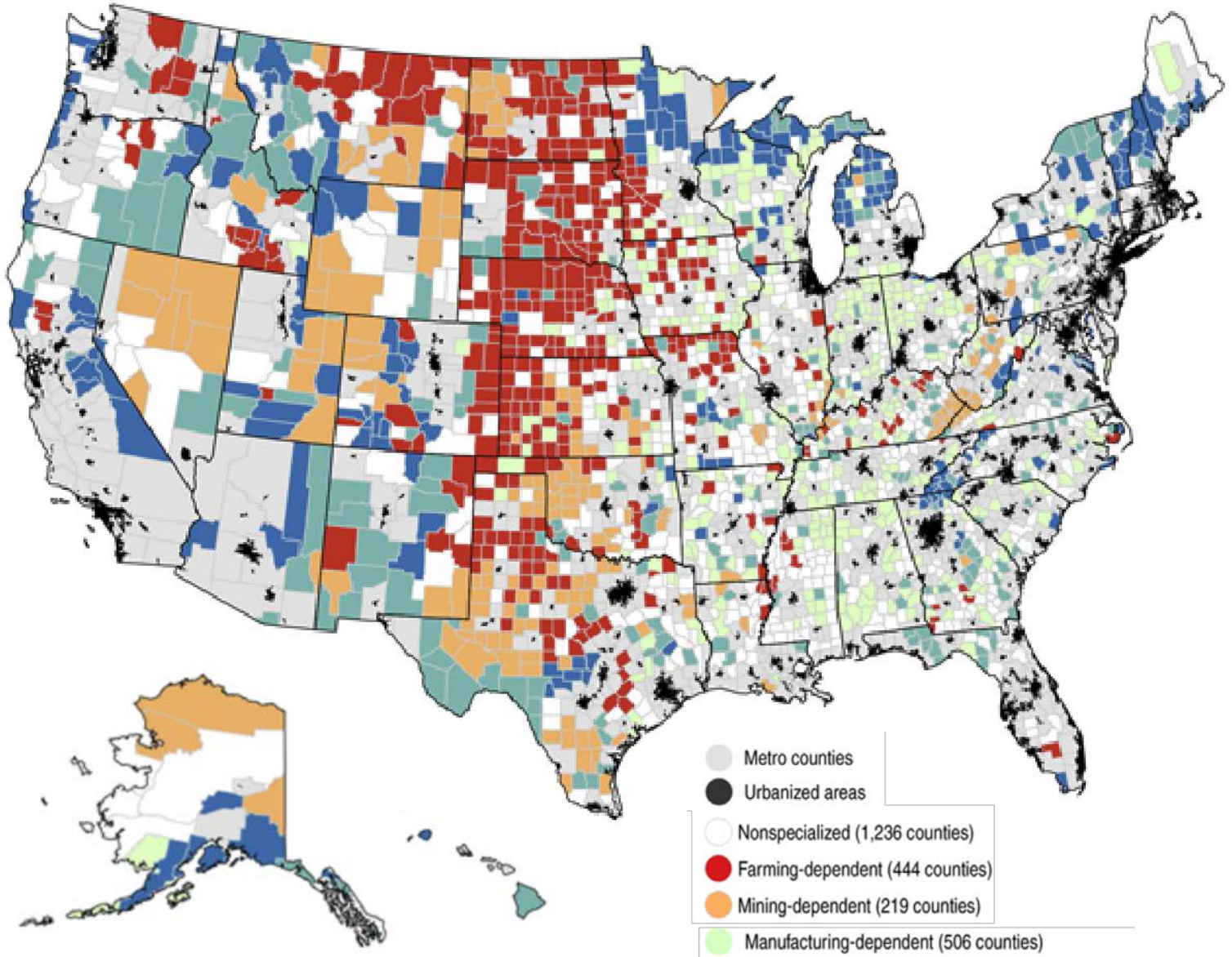
Land value in the NE region

Land value per acre ($)	US	NE
Farm Real Estate	3,080	5,050
Cropland	4,090	5,350
Pasture	1,350	3,420

Data source: USDA, Land values 2017 Summary. August 2017

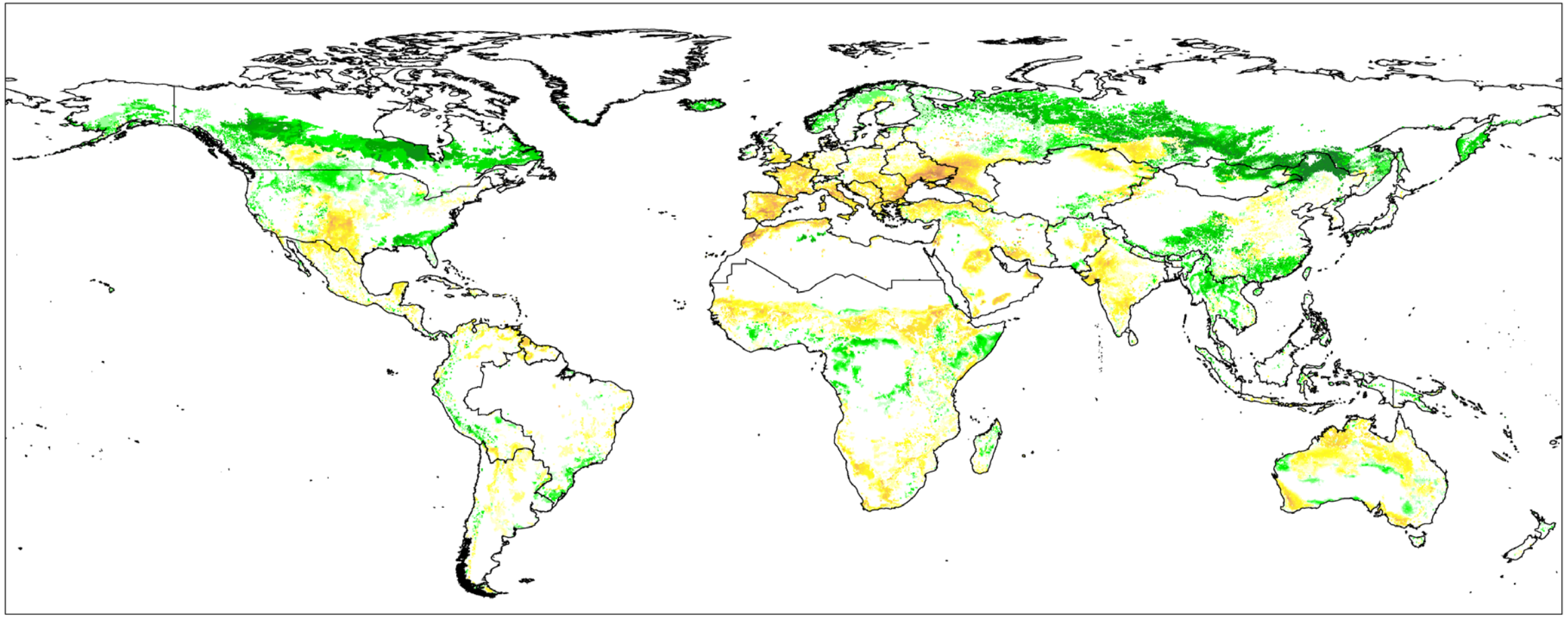
Industry dependence of rural counties, 2010-12

Recreation is an important rural activity in northern New England especially.



Source: USDA Economic Research Service using data from the U.S Census Bureau, Bureau of Economic Analysis

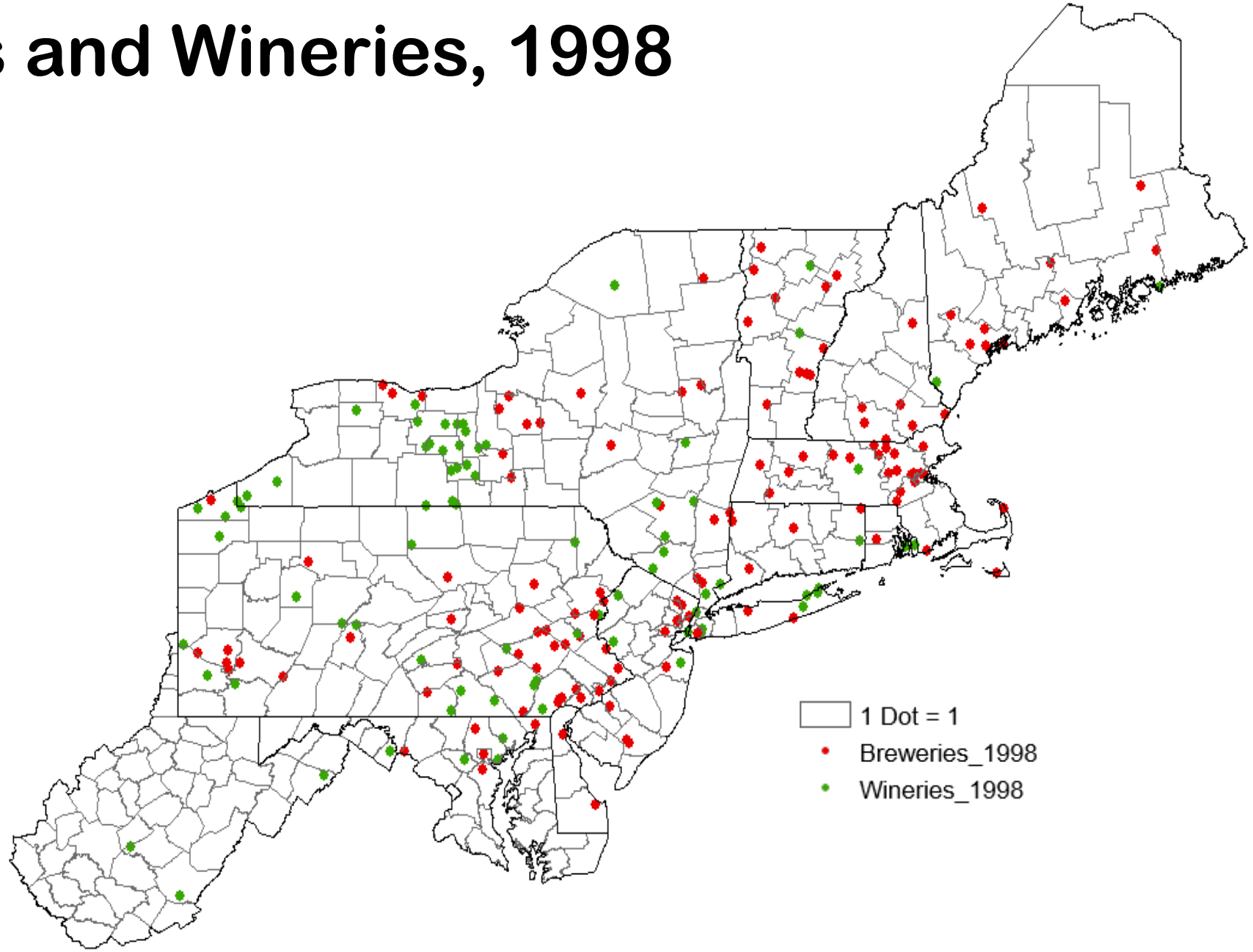
Change in agricultural suitability until 2100



Source: Zabel, F., Putzenlechner, B. and Mauser, W., 2014. Global agricultural land resources–a high resolution suitability evaluation and its perspectives until 2100 under climate change conditions. *PloS one*, *9*(9), p.e107522.

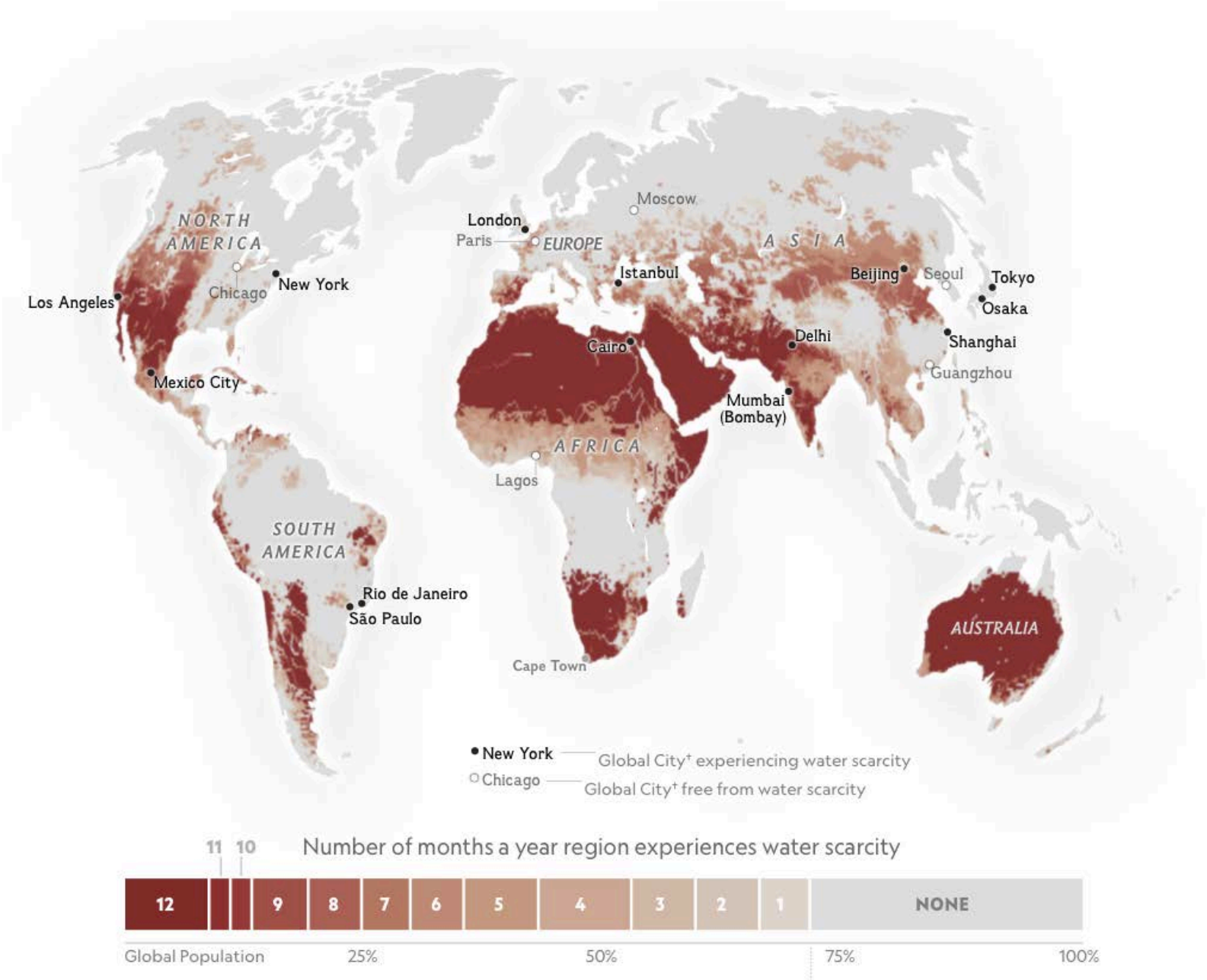
Breweries and Wineries, 1998

- 132 Breweries
- 80 Wineries



Data source: U.S. Census, County Business Patterns, 1998

GLOBAL WATER SCARCITY



https://news.nationalgeographic.com/2018/03/world-water-day-water-crisis-explained/

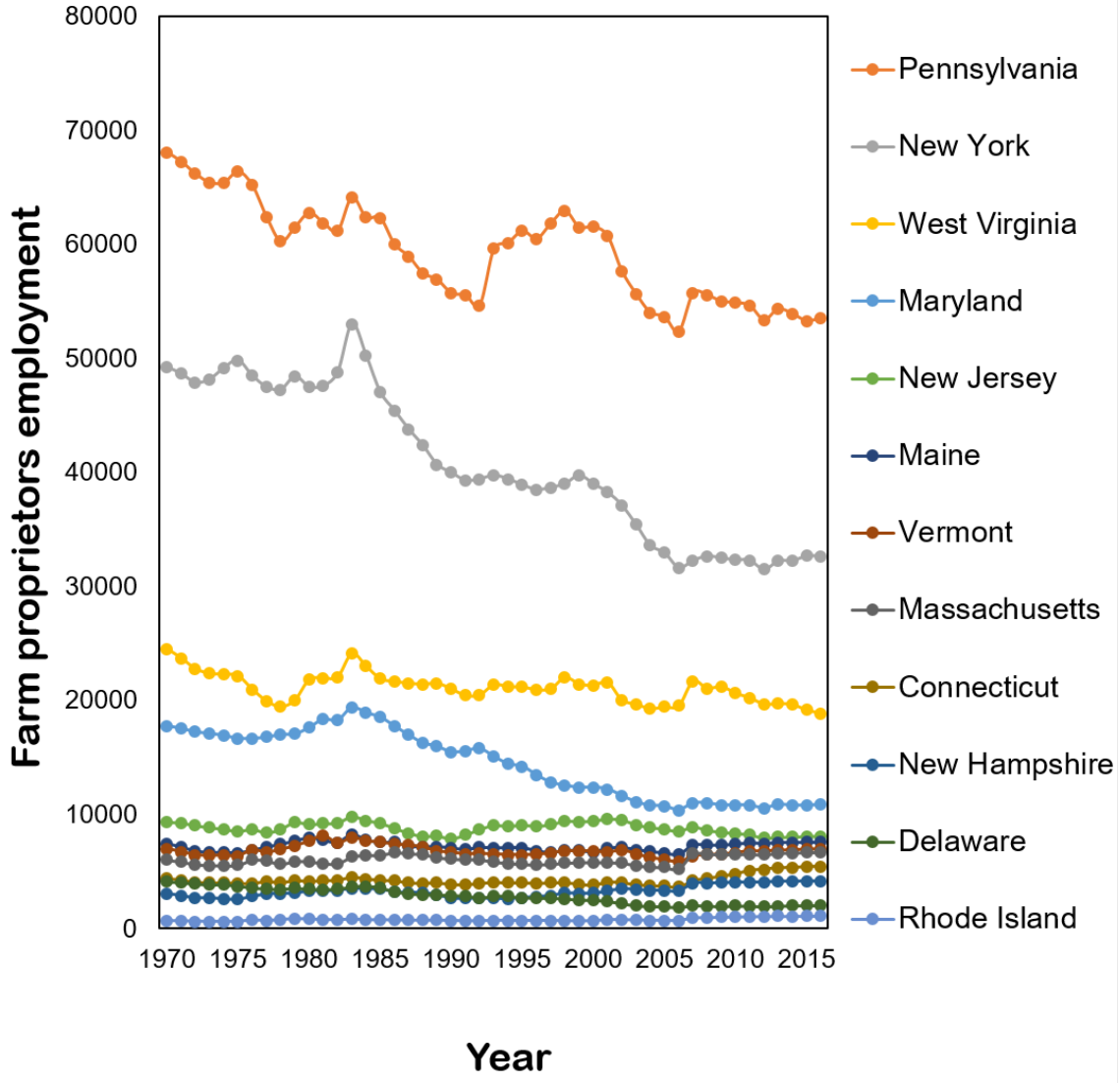
Mega-Trends

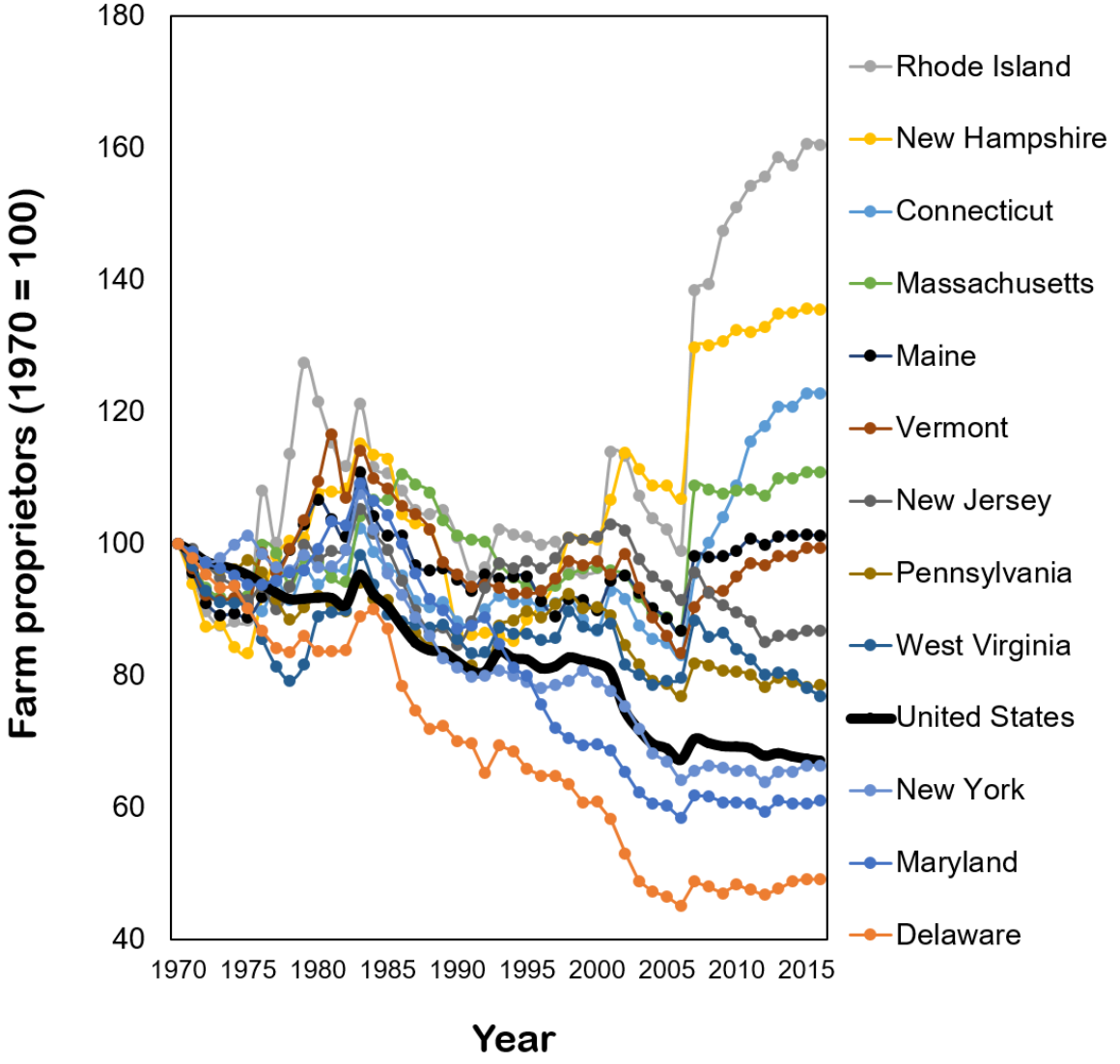
*Defined**

- Large-scale forces that affect many (or all) people
- Difficult to reverse
- Great challenges, threats to humans: but also opportunities

*Adapted from Rodney Brooks, Keynote on *Robots and People: The Research Challenge,* at International Conference on Robotics and Automation (ICRA) 2018, Brisbane, Australia.

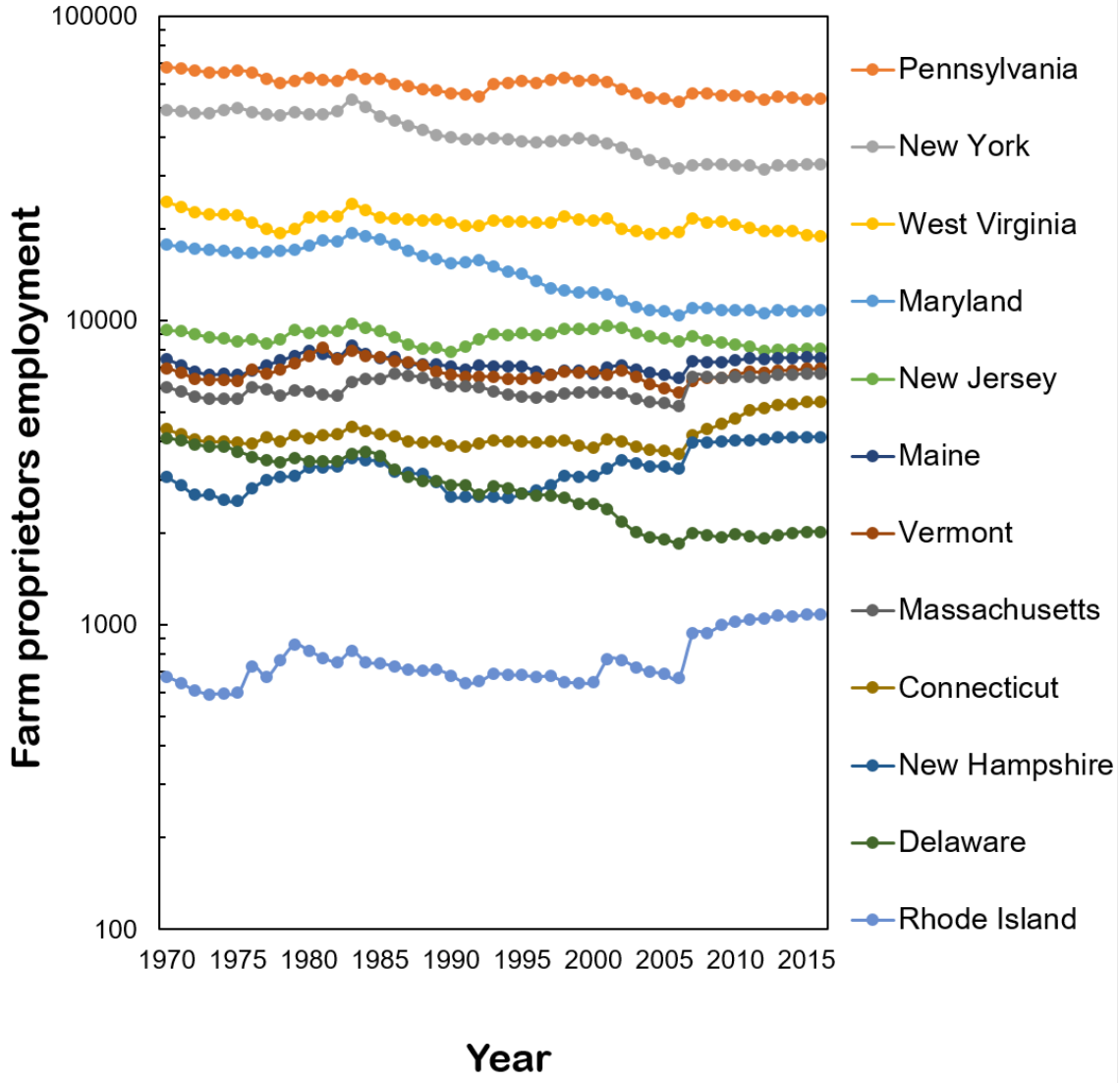
Farm proprietors, 1969-2016 by state

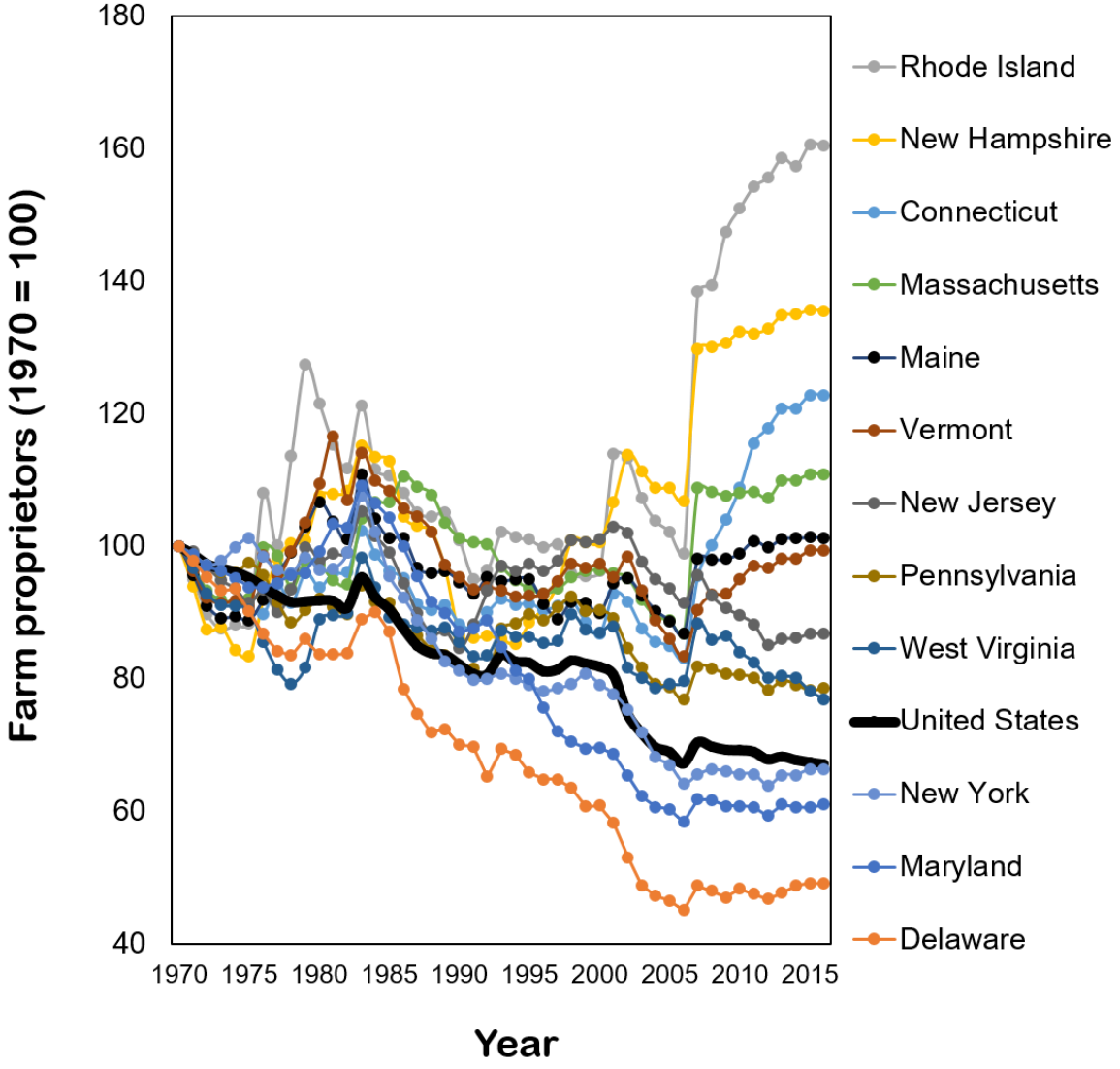




Data source: U.S. Department of Commerce, Bureau of Economic Analysis

Farm proprietors (log scale)





Data source: U.S. Department of Commerce, Bureau of Economic Analysis