Trends, Issues and Opportunities for Northeast Land Grant Universities at the Rural-Urban Fringe

Prepared for the 2018 NERA/NEED Joint Summer Meeting

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Mega-Trends affecting rural areas

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

- Consumer tastes, preferences are changing

Mega-Trends

*Defined*

- Large-scale forces that affect many (or all) people
- Are irreversible, on their own path
- Present great challenges, threats to humans: but also are opportunities

*Adapted from Rodney Brooks, Keynote at ICRA 2018, Brisbane, Aus.*
Population aging and migration
(Out) migration

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


Nonmetro population loss is now widespread in the eastern United States

Population change, 2010-16
- Population loss (1,351 counties)
- Population growth below 5 percent (487 counties)
- Population growth 5 percent or higher (138 counties)
- Metro areas (1,166 counties)
- Urbanized areas as of 2013

Source: USDA, Economic Research Service using data from the U.S. Census Bureau.
Foreign-born population (%)

- Foreign-born hold many entry level jobs, in agric., manufacturing, construction
- But they are not locating in nonmetro areas
- Need help with integration?

Data source: U.S. Census, American Community Survey 2012-2016
Pop density vs. age group

Data source: U.S. Census, Population and Housing Unit Estimates
Pop density vs. age group

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

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Pop density vs. age group

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

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Older (65+) population

- Not enough young workers to take of them
- Robots delivering medical care?
  - Medicines via drones
- Medical care delivered on-line
  - 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 living in cities (55%)
• By 2050 this is forecast to be more than two-thirds (68%)
  • United Nations Department of Economic and Social Affairs
• Driven by agglomeration economies (push/pull factors)
  • Better opportunities in job markets
  • Also better matching in marriage markets
• Greater opportunity for innovation from spillovers
  • Affects research productivity of universities(?)
• Growing more food in urban areas (e.g., UDC programs)
• Political power shifting away from rural areas
  • Rural discontent → need new frameworks, inclusion mechanisms
Urban distance vs. pop density

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
Rural-urban continuum codes

Classification based on pop size and adjacency to metro
Metro: 1,000,000
  250,000-1mn
  <250,000
Non-metro: 20,000+
  2,500-20,000
  less than 2,500
And metro adjacent or not

Data source: USDA ERS, Rural-Urban Continuum Codes, 1974
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
• Many 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 as a percent of U.S.

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<td>Land area</td>
<td>5.6</td>
</tr>
<tr>
<td>Population</td>
<td>20.4</td>
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<td>GDP or Income</td>
<td>24.0</td>
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Global shifts in production
Global shifts in production

• May 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
  • the other two are Ohio and Kentucky
• Opportunities for land grant research and outreach
  • CAPE project (NCRCRD)
  • 4-H, PROSPER
  • Role of Ag Education programs (D. Foster, PSU)
• Impact on labor force participation (H. Stephens, WVU)
Employment in the NE region

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

Data source: U.S. Census, County Business Patterns, 1998 and 2016
Global shifts in production (OECD 2018)

• Rural areas need to specialize, develop core competencies and promote tradables
• Need to raise competitiveness through innovation, skills investment
• Be open to outside investment, promote linkages between local start-ups and SEMs, MNEs
Innovation, Technological break-throughs

• Innovation is occurring in rural areas as well
  • Wojan et al. ERS Report
  • Li et al. 2015, INC5000 Firm Location Factors, *Entrepreneurship and Regional Policy*
  • Goetz and Han 2018, Latent Innovation in Local Economies, at *Economic Development Quarterly*.
• Laura Brown, UConn
• New NIFA grant
Rise of emerging economies
The fastest-growing and -shrinking economies in 2018

[Map and chart showing GDP forecasts for 2018 and the best and worst performers]

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 areas
  • e.g., demand for U.S. beer in Africa; hops?
• Opportunities for rural U.S. firms to support...
  • rising ag productivity
  • energy production
  • sustainable management of land, water resources
• Expand political, social and cultural links with emerging mkts.
Climate Change and Environmental Pressures

• Shifts in agricultural production patterns
  • How will this change processing, distribution sectors

• Artificial meat production?
  • Growing meat from cells rather than animals
  • Alternative meat movement (impossiblefoods.com; Tyson, GM, etc.)
  • Impacts on Chesapeake Bay
  • Tremendous distributional consequences

• Coastal areas threatened the most by rising water
  • 100 year flood event in Boston, MA: 2 x already this year!

• And 60% of world pop face water scarcity by 2050
  • United Nations World Water Development Report 2018
Change in agricultural suitability until 2100

http://journals.plos.org/plosone/article/figure?id=10.1371/journal.pone.0107522.g011
Historical Barley Acreage
based on NASS Survey Data

**Preliminary;** graphs in later years exclude states with <1% of U.S. total
Percent of National Barley Acreage grown in each state: 1866

Map prepared by NERCRD, using NASS Census Data
Map prepared by NERC RD, using NASS Census Data
Map prepared by NERCRD, using NASS Census Data
Map prepared by NERCRD, using NASS Census Data
1936

Map prepared by NERCRD, using NASS Census Data
1976

Map prepared by NERCRD, using NASS Census Data
1996

Map prepared by NERC RD, using NASS Census Data
2016 Note: States growing <1% of total not shown

Map prepared by NERCRD, using NASS Census Data
Water Scarcity around the globe

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 Break-Throughs
Phenomenal Advances in Ag Productivity compared to other sectors, 1947-2010...

But public investments in R&D are starting to fall further behind...

...Even as generating new knowledge (i.e., growth-increasing ideas) is becoming more costly.

The Economist, Sep 30th, 2017 “The cost of innovation has risen, and productivity has suffered”
Technological break-throughs (OECD 2018)

- AI, automation, robotics, drones…
- Decentralized energy production; cloud computing; internet of things; nano technologies
- Lead to new production possibilities and new ways of accessing goods and services
- Labor saving technology, more product innovations in ag. etc.
- New jobs e.g., in 3-D printing, drones for transporting goods
- New opportunities for on-lining learning, digital literacy

→ assumes broadband available [RRDC eConnectivity project]
Consumers!
Consumer tastes and preferences

- Demand for local has staying power
- Opportunities to grow vegetables, nutrient dense foods
  - Mushrooms as new health food?
  - Cider production?
  - Ag innovation clusters project: P. Gottlieb, Rutgers U.
- Connecting ethnic farmers with ethnic consumers (cities)
  - Andy Wetherill, Delaware State University
- Breweries and innovation: is there a connection?
## Agriculture in the NE region

<table>
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<th>Category</th>
<th>Percentage</th>
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<tr>
<td>Crop land (acres)</td>
<td>3.4</td>
</tr>
<tr>
<td>Wood land (excl. pastured, acres)</td>
<td>13.4</td>
</tr>
<tr>
<td>Vegetable, harvested, fresh market</td>
<td>10.2</td>
</tr>
<tr>
<td>Direct farm sales</td>
<td>33.0</td>
</tr>
<tr>
<td>Agritourism receipts</td>
<td>15.4</td>
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## Land value in the NE region

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<th>Land value per acre (dollar)</th>
<th>US</th>
<th>NE</th>
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<td>Farm Real Estate</td>
<td>3,080</td>
<td>5,050</td>
</tr>
<tr>
<td>Cropland</td>
<td>4,090</td>
<td>5,350</td>
</tr>
<tr>
<td>Pasture</td>
<td>1,350</td>
<td>3,420</td>
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Data source: USDA, Land values 2017 Summary. August 2017
Fresh market vegetables and direct farm sales vs. population density

Recreational Economies/tourism

• Growth in recreation value-added has been twice the growth of U.S. GDP in 3 of last 4 years (BEA 2018)
• $373.7 bn. in 2016
• About twice the value of farming, forestry and fisheries

• China: tourist spending in 2016 of over $250 bn world wide, up 5-fold from 2010 (The Economist, 2018)
Recreation is an important rural activity in northern New England especially.
Agritourism receipts vs. pop density

Agritourism activity tends to cluster on the rural-urban interface

Opportunities for LGUs

• Problem of too much tourism: Venice, New Zealand, etc.
  • Bar Harbor, ME cruise ships (J. McConnon, T. Gabe, UME)

• Significant opportunities in agritourism, value-added ag.
  • Agri-tourism (L. Chase, UVM)
  • Prohibition trails (H. Manzo, PSU)

• “ScotLAND of Food and Drink”
• “Food and Drink Wales”: regional branding related to food
  • Food Tourism Toolkit

• About 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

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

Image: University of Vermont

Dog Fish Head Brewery!
Breweries and Wineries, 1998

- 132 Breweries
- 80 Wineries

Data source: U.S. Census, County Business Patterns, 1998
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 Neil Reid, Cleveland State University, Ohio
…moving (back?) to the Midwest, Northeast: 2012 data
Locations of Hops areas and breweries

Opportunities for developing branded local supply chains?

Clusters of growing regions (farmers)

University research on climate adaptation, profitability, other*

*N. Reid, 2017 NARSC presentation
Creativity index vs. 2000 breweries per capita

US

NE

R² = 0.0178

R² = 0.0117
Finally...

- Hold for silo graph
Acknowledgements

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• Dr. Yicheol Han
• Sarah Denny
• Dr. Elizabeth Dobis
• Heather Manzo
• Kristen Devlin
Farm proprietors

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

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

- Explanation
- 2016

Farmer density = # farm proprietors / land area (square miles). Data source: U.S. Department of Commerce, Bureau of Economic Analysis.
Farmer density change = log(farmer density 2016 / farmer density 2006). Data source: U.S. Department of Commerce, Bureau of Economic Analysis
Breweries and Wineries

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