Long-term Transformational Agricultural Change in Rural Ontario
Paul Smith

Outline

• Long-term trends in agricultural land use and agri-environmental variables.
• Use the data to tell the story of change in rural Ontario.
• Compare with change in other provinces, US, Europe and beyond where data available.
• Inform evidence-based agri-environmental policy.
• Variety of data: Census, fertilizer sales, pesticide survey, stewardship statistics
• Variety of time frames depending on data set, e.g. 1826-2016, 1976-2016
• First Nations agriculture significant pre-contact
• Post-contact growth of agriculture to 1931
• 45.9% drop in farm area 1931-2016
• 10.1% to 5.6% of Ontario area
• 61% to 35% of southern Ontario
• Continued small declines in farm area
• Remarkable production boosts

Ontario Farm Area 1826-2016

Ontario Farm, Crop & Pasture Area 1921-2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Total area of farms (Millions)</th>
<th>Land in Crops (Hectares)</th>
<th>Pasture (Hectares)</th>
</tr>
</thead>
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<td>1921</td>
<td>10</td>
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<td>8</td>
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<tr>
<td>1956</td>
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<td>2</td>
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<td>1966</td>
<td>5</td>
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<tr>
<td>1976</td>
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<tr>
<td>2016</td>
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</tbody>
</table>

Change in fuel sources
Mechanization
Population shift to urban
Treaties
Global Trends in Farmland

- Major decrease in farmland in many OECD nations
- Increased production on smaller footprint
- Increases in farmland in many developing nations
- China & India more complex
- Major farmland abandonment in former Soviet countries

Source: World Bank 2018
Farm Area Trends - Provinces

- Distinct eastern + western patterns
- Earlier eastern peaks in early 20th century
- Western peaks in late 20th century
- Similar in USA
- Reflects colonial history
- Major decrease in farm area & cropland in many OECD nations
- Increases in developing nations

Cropland Trends - Provinces

- Distinct eastern + western patterns
- Stable or declining in east
- Western peaks in late 20th century
- Similar to Farm Area trends
Average Farm Size Trends - Provinces

- Farm size often discussed
- Size is of limited value in overall trends
- Ontario has smallest AVERAGE farm size, except NL
- Similar to farm size in NE USA and UK
- Economic phenomenon across all sectors
- Masks trends by sector

Change in Farm Land Use

- 1921-2011 large shift in composition of farmland
  - More crops, less pasture, woods & wetland
- Mechanization, fuel switching a significant factor
- Decreases in relative amount of woodland & wetland on farms
- Not necessarily loss of the habitat
- More forest now overall, especially north, east & central
- Shift in who owns these non-production lands
- Large growth in non-farm rural landowners
Ontario Field Crops 1921-2016

- Shift toward annual crops
- Soybeans, corn
- Cereals stable
- Enormous increases in yield
- Decreases in hay, pasture
- Linked to livestock change
- Major trend
- Simplified rotations

Horticulture crops 1921-2016

- Fruit acreage decreased, but production increased
- Field vegetable acreage increase until 2001
- Challenges in processing capacity
- Major growth in greenhouse sector, vegetables & flowers
Crop Diversity 1976-2016

- Shift toward annual crops
- Soybeans, corn
- Cereals stable
- 3 annual crops change from 28% to 61% of land 1976-2016
- Simplified rotations
- Fewer crops in rotations
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- Linked to livestock change
- Major trend

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Tillage 1991-2016

- Census question on tillage has 3 categories
- Tillage decreased 1991-2011
- 2016 first time tillage increased since 1991
- Implications for soil health

Hay Crops

- Census tracks two categories of hay
- Decreases in both alfalfa mixtures & other hay
- Essentially “dairy” & “beef/sheep” mixes
- Decline after 1976 linked to beef decreases
- Decline after 2006 linked to high crop prices
- Forages benefit pollinators & grassland wildlife
Change in Livestock 1921-2016

- Since 1976, decreases in cattle numbers, dairy & beef
- Production increases
- East to west shift in Canada in beef
- Major change
- Less hay, pasture, manure
- Ongoing increases in poultry
- Cyclical changes in pig numbers
- Reduced manure

Changing Horse numbers

- Census records horses on farms
- Large decreases with mechanization
- 2016 census 64,536 horses
- Recreational use of horses
- Estimates of total numbers of horses 230,000-380,000 (2006)
- Concentrated in urban fringe
Nitrogen + Phosphorus from Fertilizer

- Growth 1950s to 80s
- Decline to early 2000s
- Growth in yield & nutrient efficiency
- 2008 start of high price period
- Conversion to annual crops, especially soybeans
- Decrease in manure over same time

Pesticide Use 1983-2013

- Growth to 1980s
- Food Systems 2002 led to decreases
- Herbicide switching
- Glyphosate increases
- Similar trends in US, Europe
- More significant reductions in ON vs US
Ontario EFP Participation

- EFP participation strong 1994-2004
- Surge in participation during APF and early Growing Forward
- Diminished participation in Growing Forward 2
- Recent increase due to Great Lakes Ag Stewardship Initiative

What Changed 1976-2016?

- Soybeans: Increasing
- Greenhouses: Decreasing
- Vegetables (field): Decreasing
- Percent Owned: Decreasing
Key Findings

• Long-term decrease in overall area of agriculture in Ontario (-45.9%, 1931-2016)
• From 10.1% to 5.6% of Ontario area 1931-2011 (61% to 35% of southern Ontario)
• Stable area of cropland, increase in annual cropping, decrease in forages (-50% hay, -80% pasture; 1921-2016)
• Decrease in cattle (-34%), increases in chicken & hogs
• >1970s, agri-environmental stewardship increased, some environmental risks decreased, reduced pesticide use (-45%), phosphorus fertilizer (-30%) & manure volumes (-43%)
• Ontario trends unique, differing considerably from western Canada, some similarities with other eastern provinces, the mid-west and eastern US and other developed countries.

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