Agriculture Land Conversion in Alberta

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Background

• Urban development of concern due to pressure for conversion/fragmentation of agricultural land
  – Economic, social, environmental costs
  – Potential conflicts between farm businesses and new residents
  – Bylaws restricting agricultural activities
  – Inability to achieve economies of scale
  – Reduced level of “service” from related agribusinesses

• How big a problem?
“Economic Evaluation of Farmland Conversion and Fragmentation in Alberta”

• Three year project funded by ALI
• Assess/Quantify economics of agricultural land fragmentation and conversion
  – Four individual studies
• Objectives:
  – Examine degree of conversion/fragmentation and identify contributing factors
  – Identify areas of risk for increased fragmentation/conversion in future
  – Identify and assess values of multiple goods and services associated with land use
  – Inform policy makers
Spatial Analysis of Agricultural Land Conversion in Alberta

• Objectives:
  – Examine degree and pattern of change in land cover over the period 2000-2013
  – Identify contributing factors (e.g., market returns, development pressure, fragmentation)
Study Methods

• Remote sensing data for multiple years (land cover) from AAFC

• Graphical/Tabular presentation of land cover and patterns of land cover change

• Statistical analysis to relate land cover changes to potential drivers, 2000 - 2012
## Land Cover, Alberta White Zone (ha, 2000 – 2013)

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>2000</th>
<th>2013</th>
<th>Annual Rate of Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cropland</td>
<td>8,987,533</td>
<td>9,801,750</td>
<td>0.70</td>
</tr>
<tr>
<td>Pasture</td>
<td>+6,013,712</td>
<td>+4,213,093</td>
<td>-2.30</td>
</tr>
<tr>
<td>Agricultural Land</td>
<td>15,001,245</td>
<td>14,014,843</td>
<td>-0.51</td>
</tr>
<tr>
<td>Forest</td>
<td>3,734,371</td>
<td>3,716,156</td>
<td>-0.038</td>
</tr>
<tr>
<td>Grassland/Shrubland</td>
<td>4,928,008</td>
<td>5,425,905</td>
<td>0.78</td>
</tr>
<tr>
<td>Wetland</td>
<td>814,486</td>
<td>1,005,226</td>
<td>1.80</td>
</tr>
<tr>
<td>Other</td>
<td>755,259</td>
<td>919,756</td>
<td>1.68</td>
</tr>
<tr>
<td>Developed</td>
<td>303,016</td>
<td>429,604</td>
<td>3.21</td>
</tr>
</tbody>
</table>
# Land Cover Conversion, Alberta White Zone (2000 – 2013)

<table>
<thead>
<tr>
<th>Conversion</th>
<th>2000 - 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cropland to Developed (Annual Average)</td>
<td>66,679 (4,763)</td>
</tr>
<tr>
<td>Pasture to Developed (Annual Average)</td>
<td>60,766 (4,340)</td>
</tr>
<tr>
<td>Agricultural to Developed (Annual Average)</td>
<td>127,445 (9,103)</td>
</tr>
</tbody>
</table>
Spatial Regression Analysis

• Uses data for land cover change, 2000 – 2012
• Regress area converted from agriculture to developed on explanatory variables

• Results?
  – Population density (+, but non-linear)
  – Proximity to urban centres (+)
  – Neighbour spillover effects (+)
  – Results are region-specific
Alberta White Zone
Forest Conversion to Agricultural Land (2000-2013)

2000 - 2009 (ha)
- 0 - 88.19
- 88.19 - 283.61
- 283.61 - 615.10
- 615.10 - 1219.03
- 1219.03 - 3123.83

2009 - 2013 (ha)
- 0 - 51.41
- 51.41 - 143.35
- 143.35 - 261.46
- 261.46 - 453.88
- 453.88 - 1250.64

Kilometers
Results

- Major provincial land use changes:
  - Agricultural land conversion to development
  - However, other conversions also occurring (net effect?)

- Loss of Agricultural Land?
  - 0.85% of agricultural land converted for development 2000-2013 (~127,450 ha, annual rate of 0.07%)
  - Greater concentration in Edmonton-Calgary Corridor
  - Conversion tends to be on higher quality land

- Fragmentation?
  - Inconclusive results but tend towards less fragmentation
Additional Considerations?

• What’s lost with conversion?
  – Agricultural productivity (net impact?)
  – Local food production
  – “amenities” and ecosystem services

• What’s gained?
  – Property values

• Need for “valuation” research
Thank you for your time and attention!

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