Agriculture in the Great Lakes Basin:

How is it Changing and What is the Effect?

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Outline

- Purpose
- Methods
- Trends pre-1900-2006 and 1976-2006
- Comparison with PLUARG predictions
- Conclusions

Purpose

- Examine long term trends in Ontario agriculture
  - Land use, crops, livestock, stewardship
  - Provincial scale; not regional or GIS analysis
- Compare with PLUARG predictions on agricultural land use & pesticides

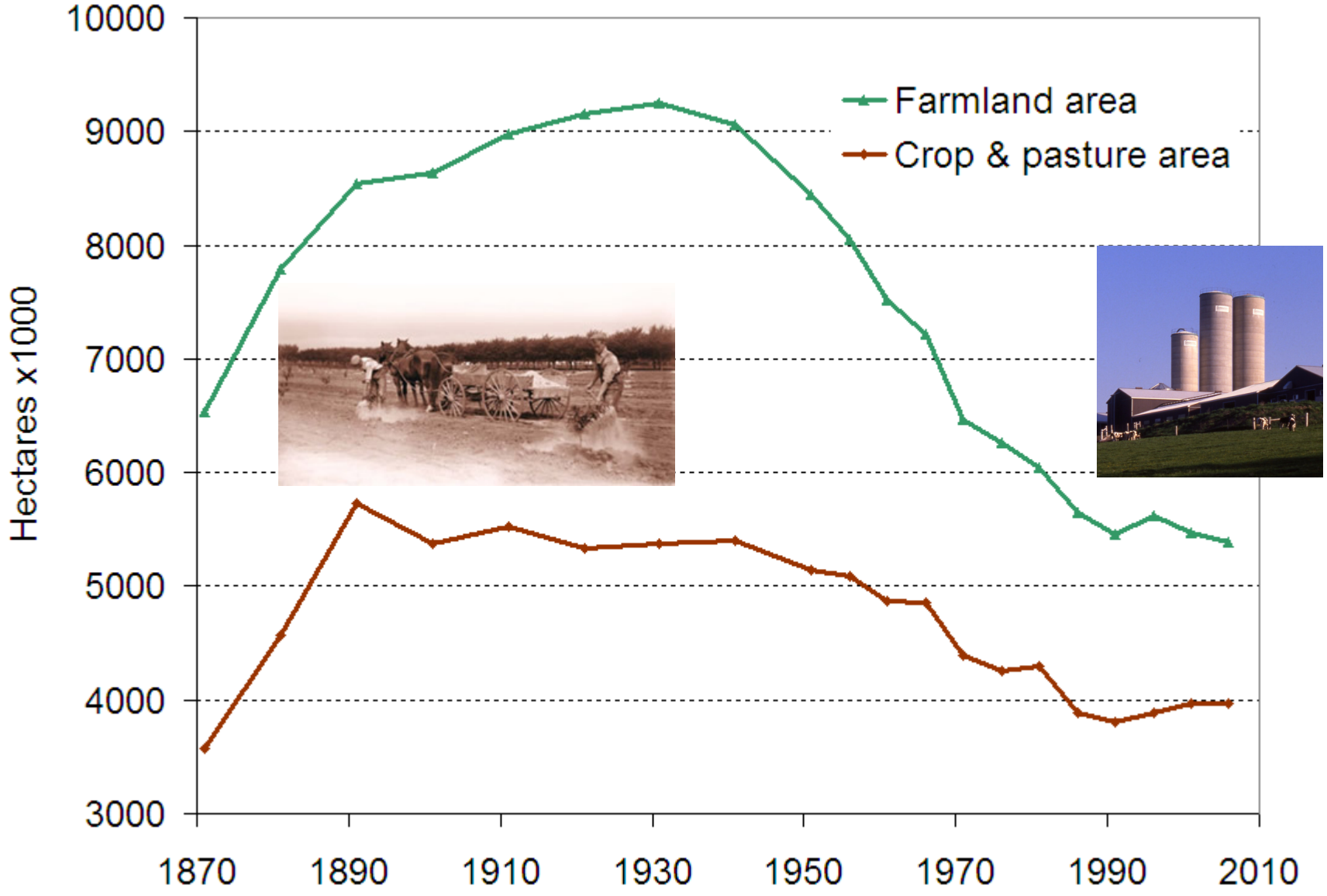
Data: Census & Farm Stewardship

- Long term pre-1900-2006 and 1976-2006 Agriculture Census at provincial scale
  - Numbers of farms, types of farms, farm & crop area, livestock numbers
  - Some land practices: fertilizer use, tillage
- Recent stewardship activities 1993-2010
- PLUARG Predictions

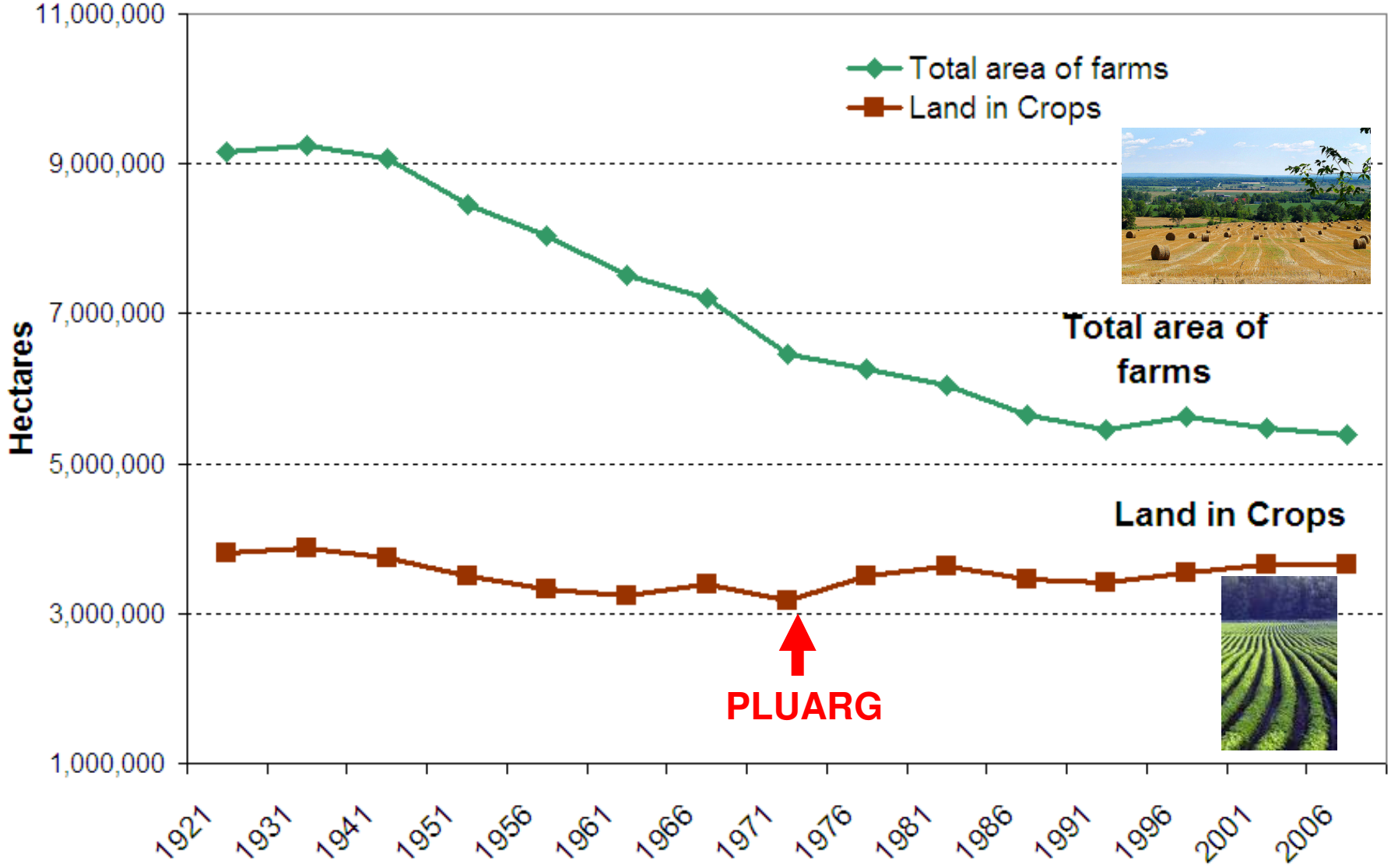
Trends in Ontario Agriculture

- Historic period of agricultural expansion 19th century & early 20th century
- Decrease in land occupied by agriculture in 20th century, growth in non-farm rural
- 20th century shifts created by markets, specialization, genetics, mechanization & efficiency
- What factors have changed, how & why

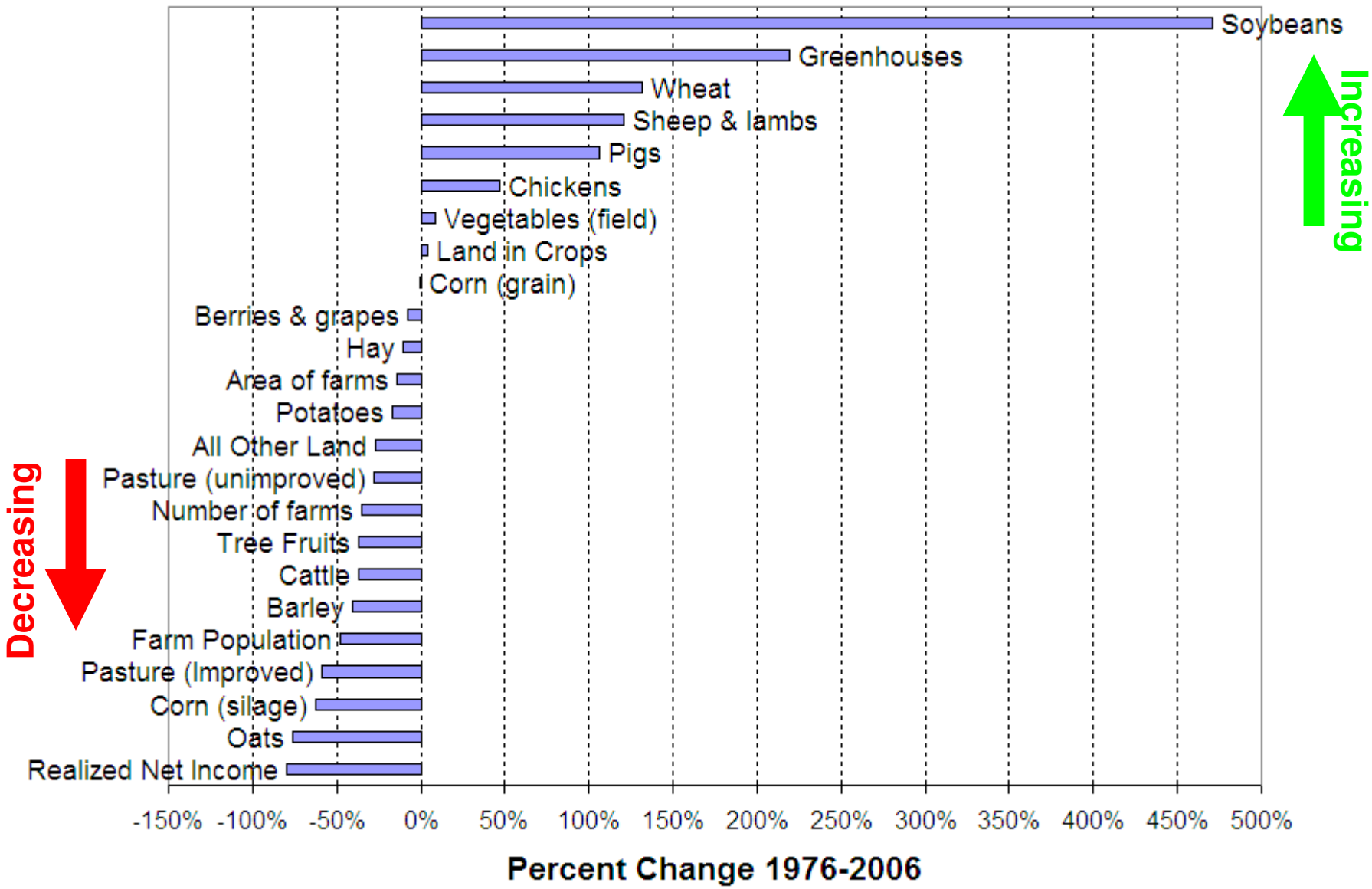
Farmland Area 1870-2006



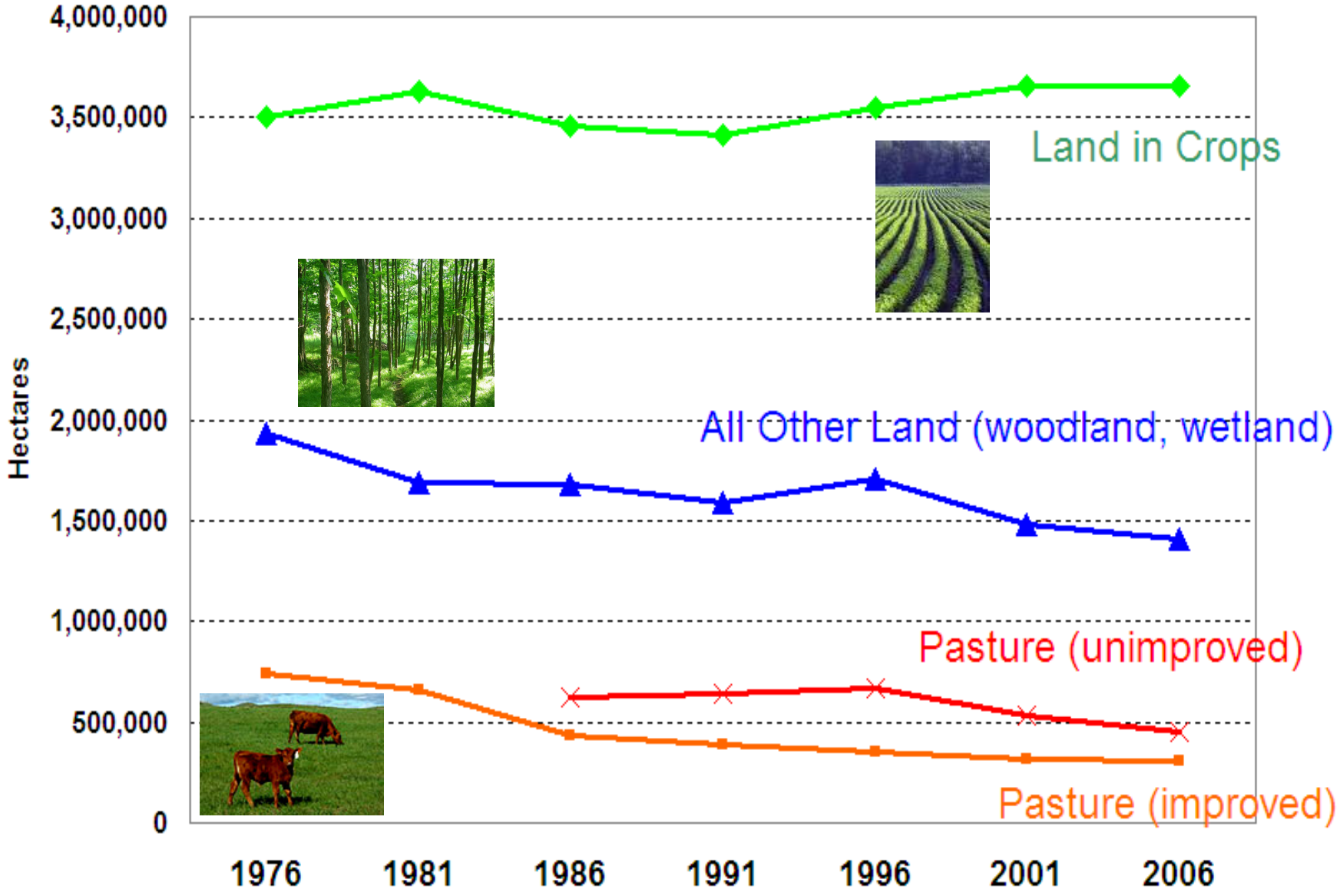
Farm & Crop Area 1921-2006



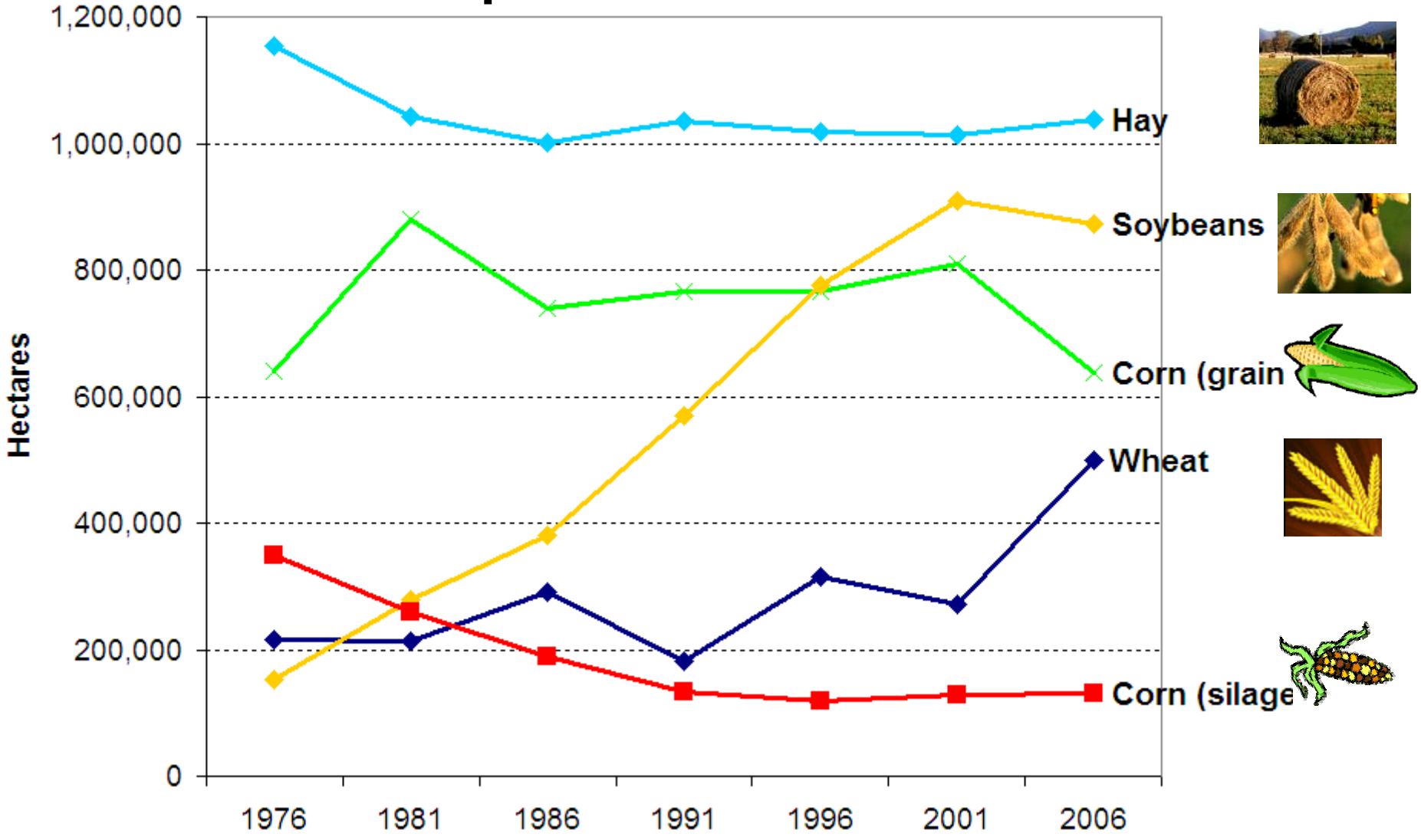
How Much Have Things Changed?



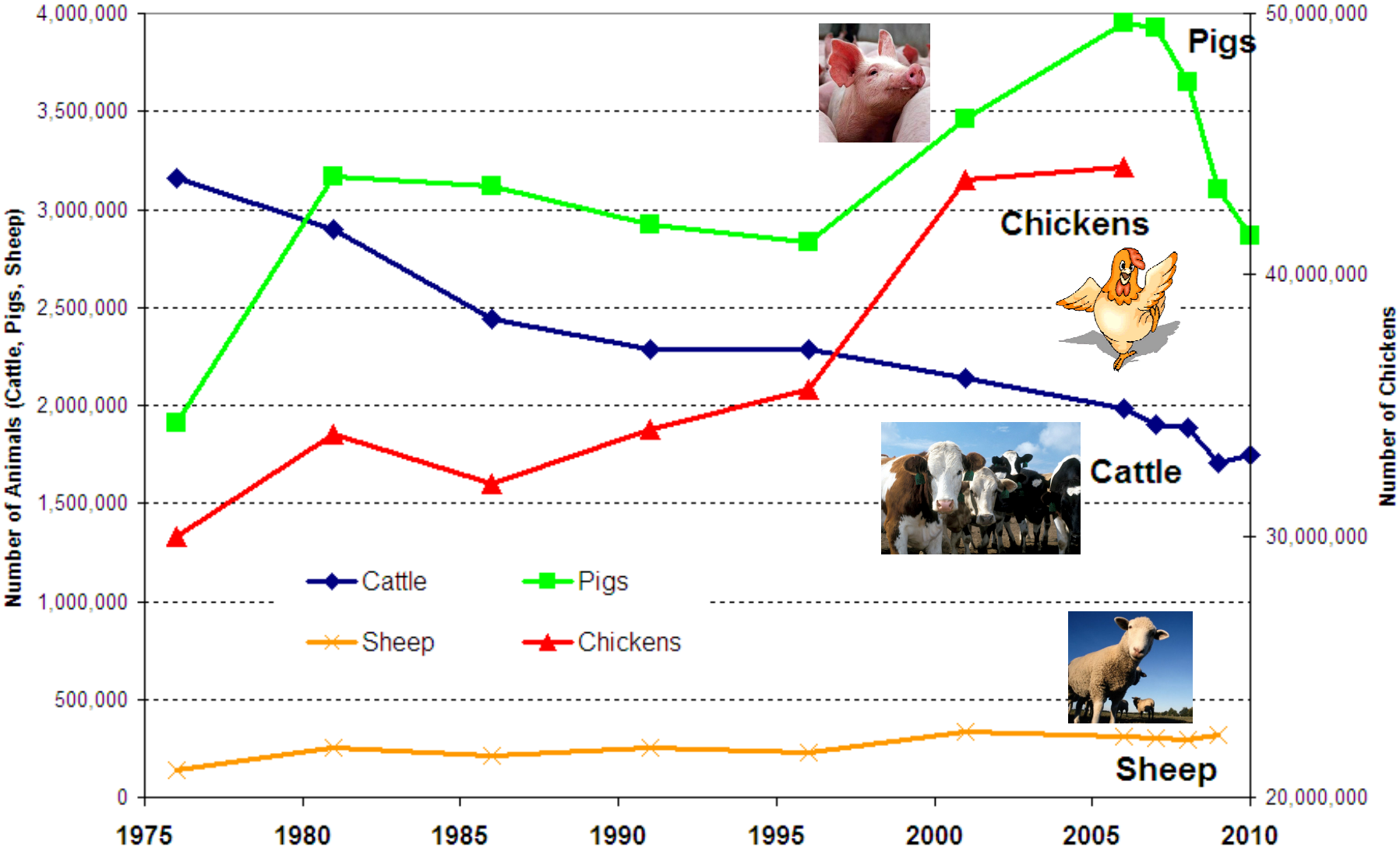
Major Land Use Change



Crops 1976-2006



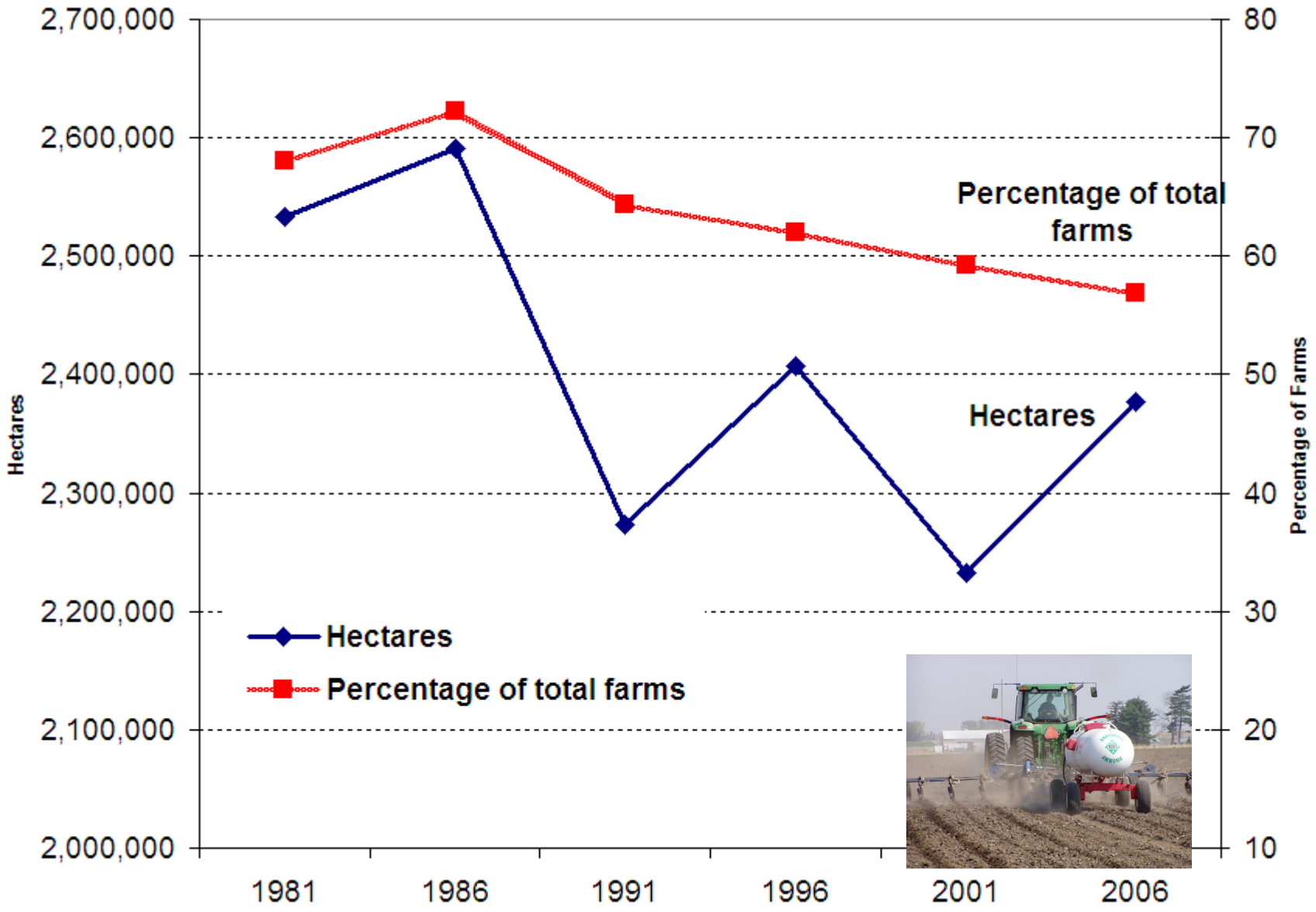
Livestock 1976-2010



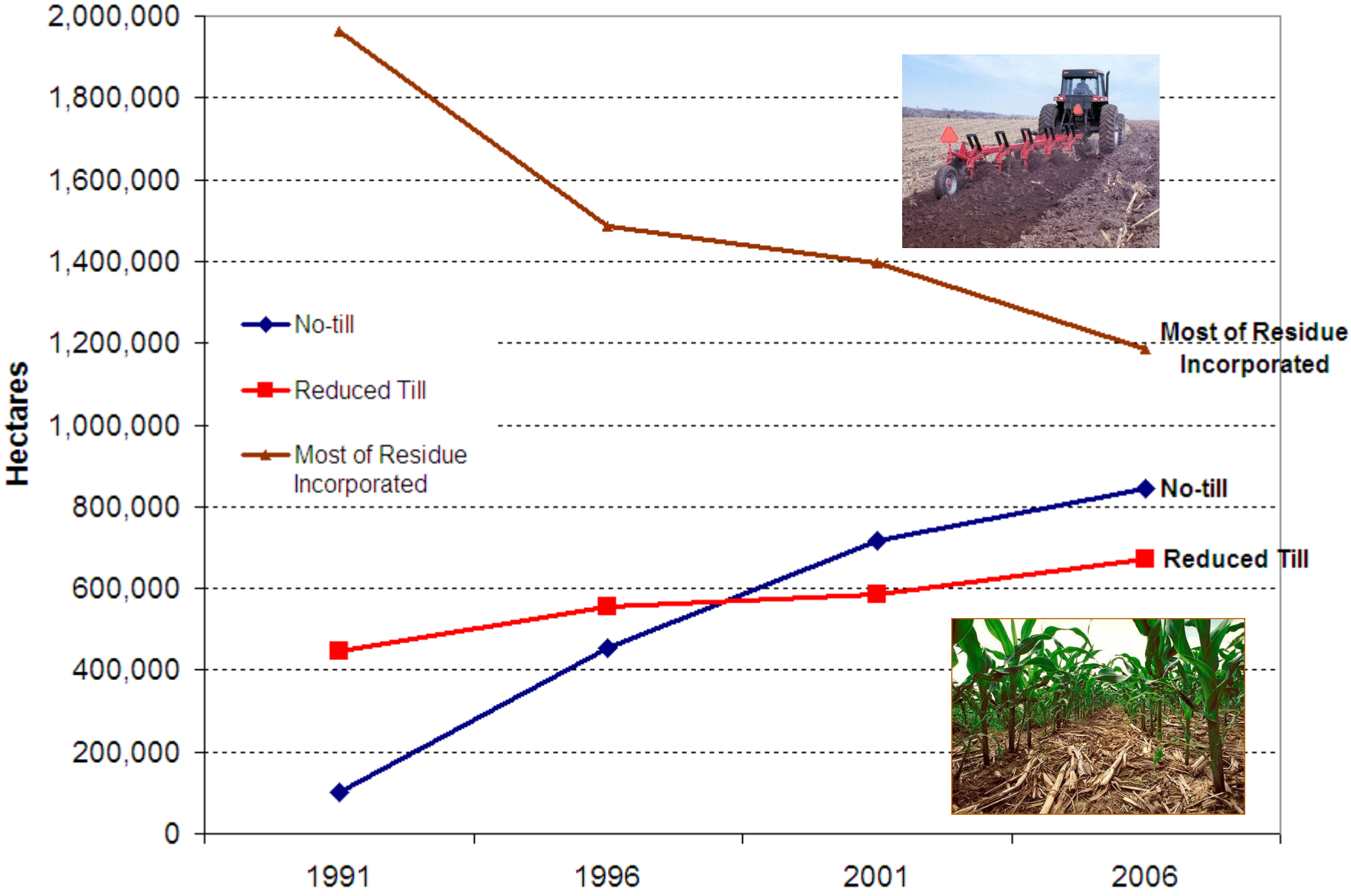
Trends

- Less area devoted to farms, fewer farms
- Economic productivity growth, like all sectors
- Decrease in farm population, net income
- Amount of cropland stable, pasture decreasing, woodland/wetland decreasing
- Ownership decreasing, land rental increasing
- Pasture, woodlot, wetland appear to be shifting to non-farm rural landowners
- Crops shifting, soybean-wheat-corn rotation prevalent
- Growth in vegetable & greenhouse sectors
- Increase in chickens, decrease in cattle, hogs cyclical
- Specialization, regional trends

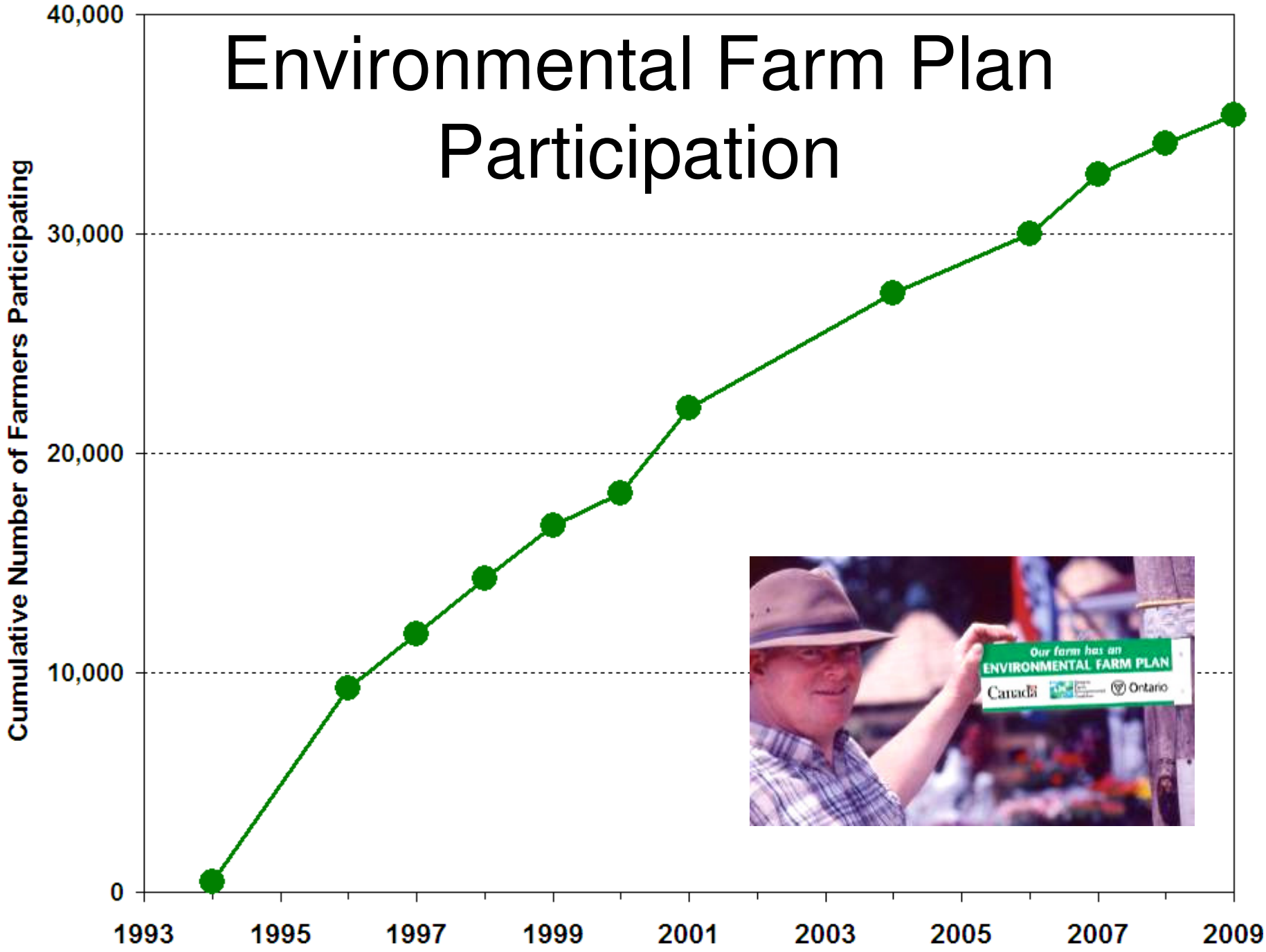
Fertilizer Use



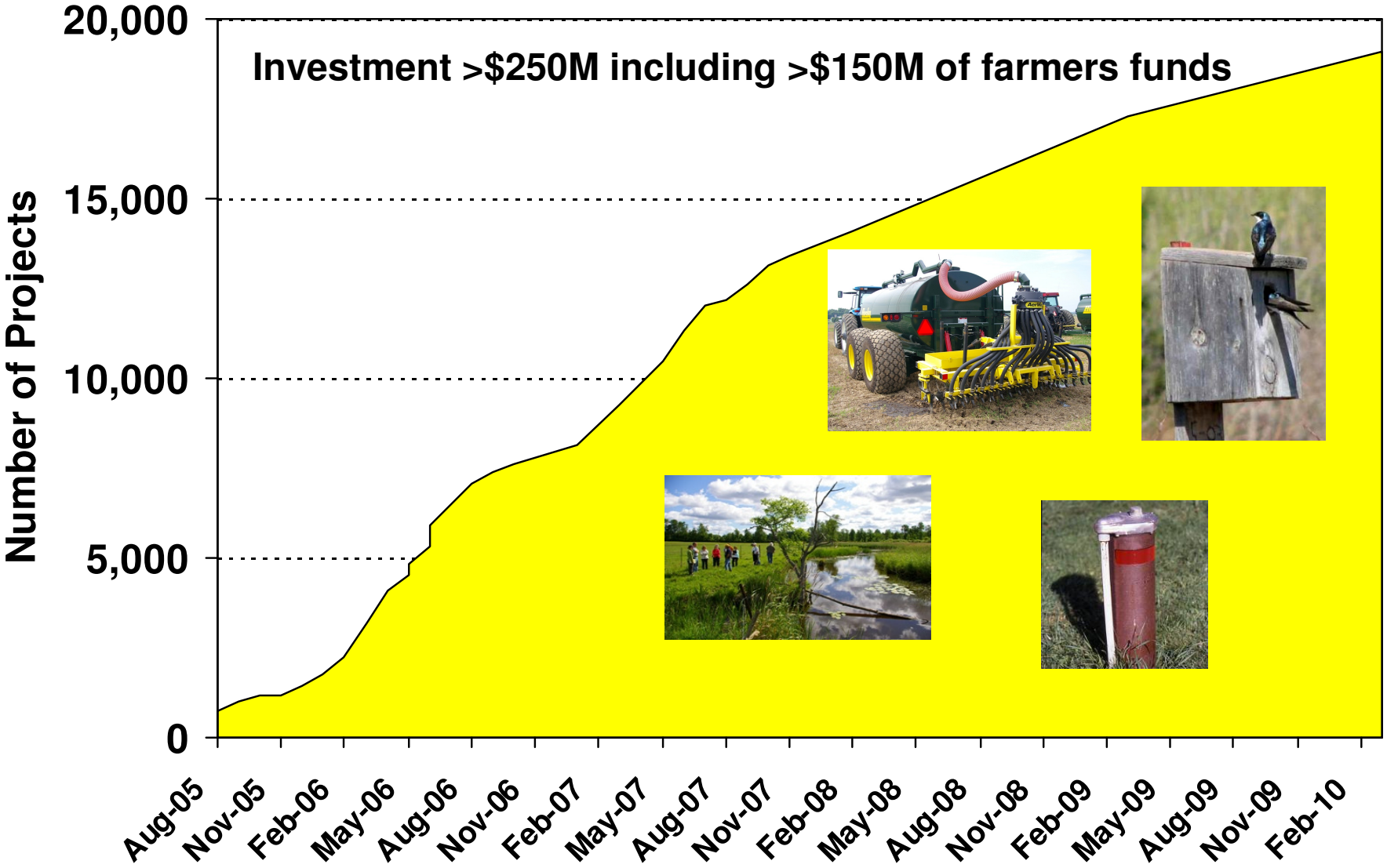
Tillage 1991-2006



Environmental Farm Plan Participation

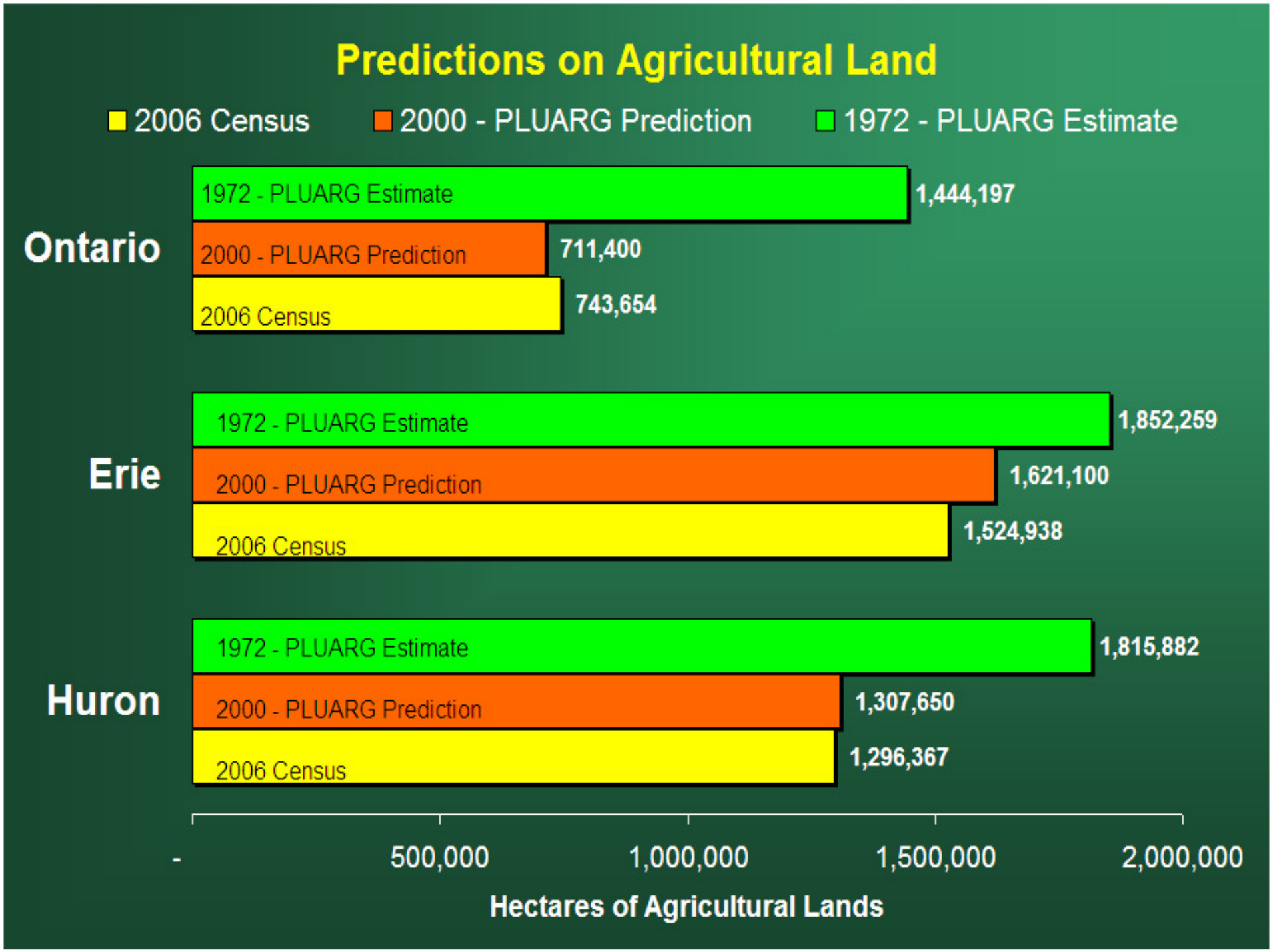


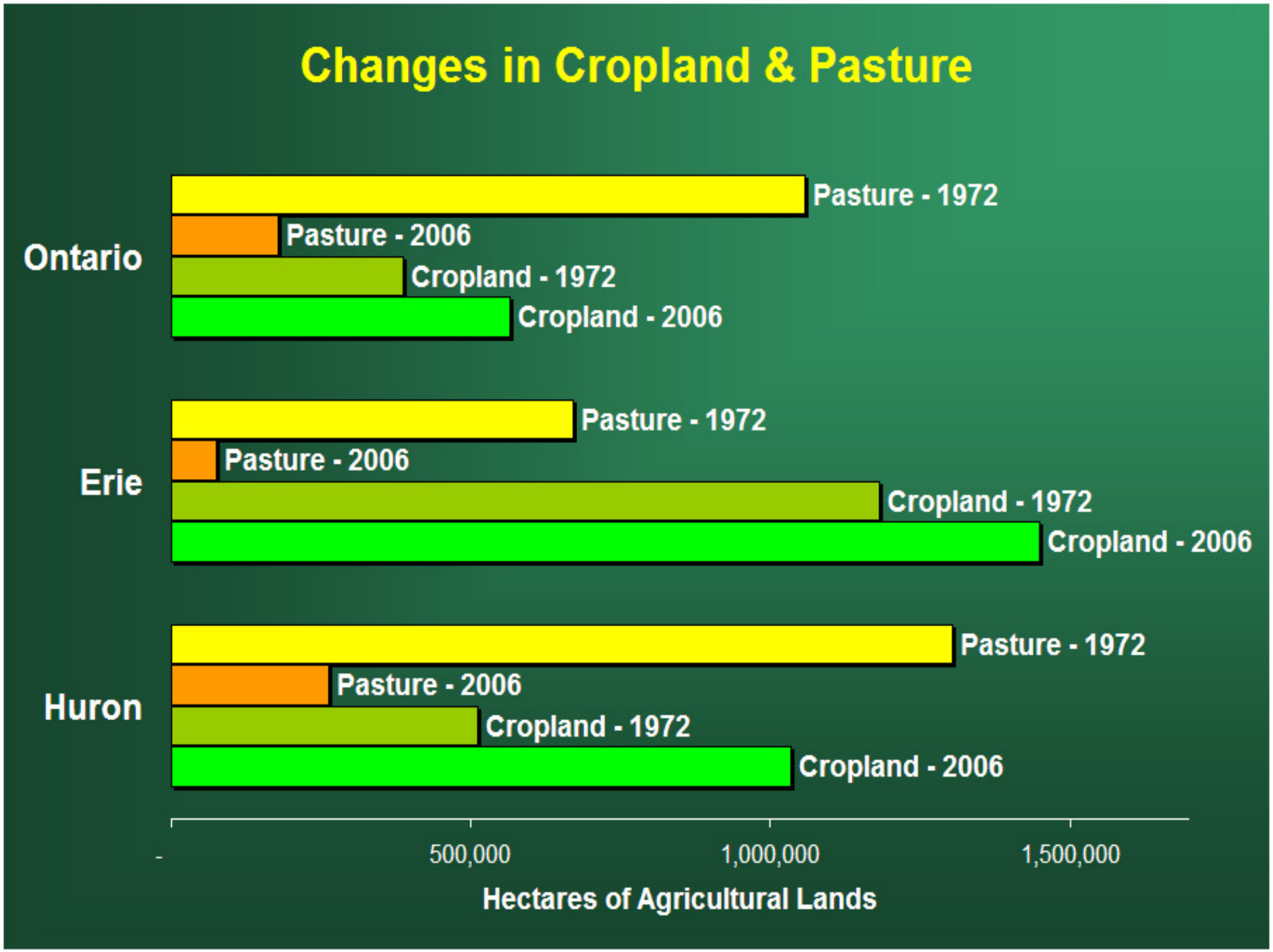
On-Farm Environment Projects 2005-2010

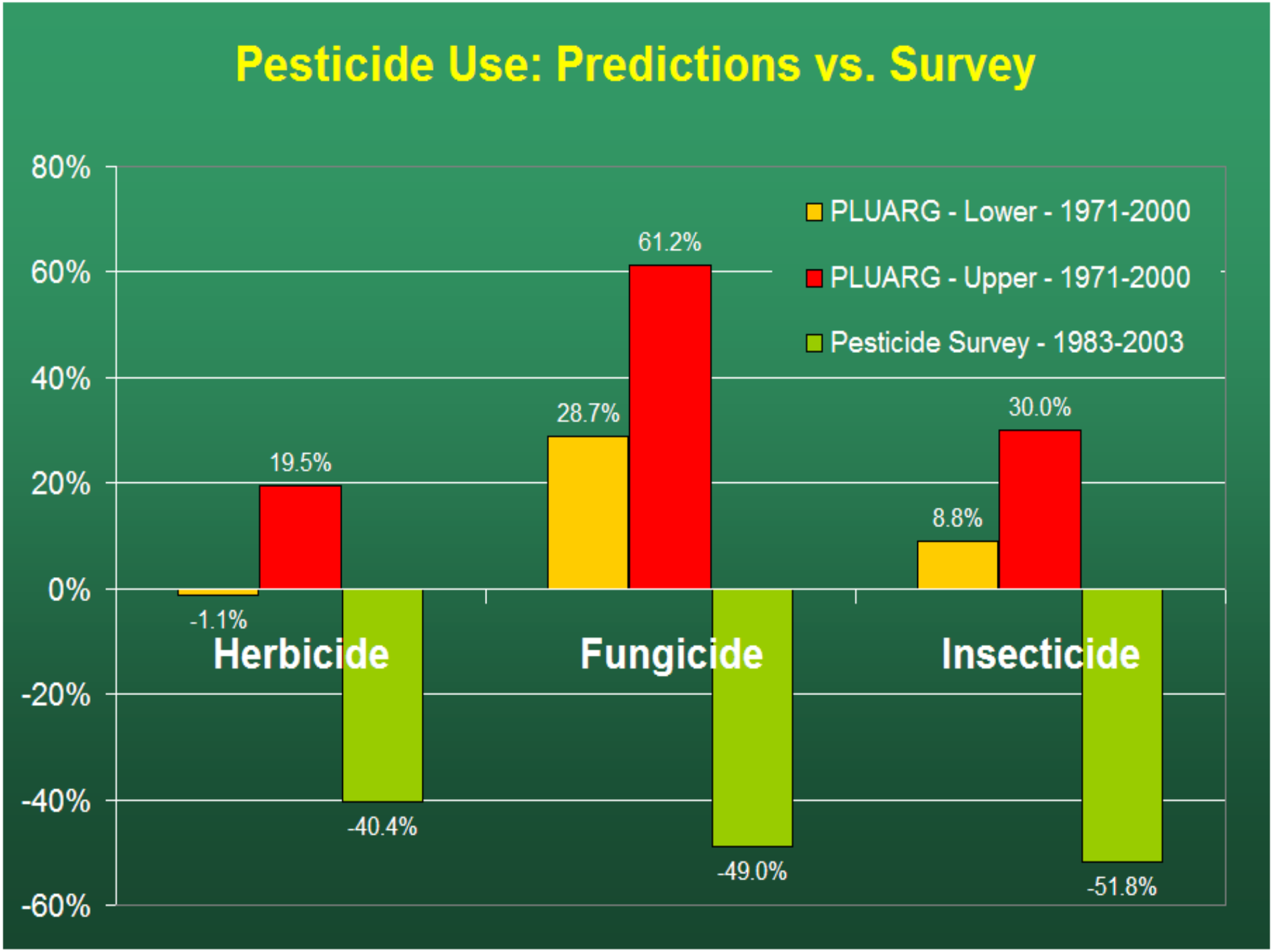


PLUARG Predictions

- Landmark 1970s PLUARG studies predicted trends in land use & effects
- Predicted agricultural land use, pesticide use, fertilizer use for 1980, 2000, 2020
- How accurate were those predictions?


Predictions on Agricultural Land
2006 Census
2000 - PLUARG Prediction
1972 - PLUARG Estimate
Ontario
1972 - PLUARG Estimate
1,444,197
2000 - PLUARG Prediction
711,400
2006 Census
743,654
Erie
1972 - PLUARG Estimate
1,852,259
2000 - PLUARG Prediction
1,621,100
2006 Census
1,524,938
Huron
1972 - PLUARG Estimate
1,815,882
2000 - PLUARG Prediction
1,307,650
2006 Census
1,296,367
-
500,000
1,000,000
1,500,000
2,000,000
Hectares of Agricultural Lands


Changes in Cropland & Pasture
Ontario
Pasture - 1972
Pasture - 2006
Cropland - 1972
Cropland - 2006
Erie
Pasture - 1972
Pasture - 2006
Cropland - 1972
Cropland - 2006
Huron
Pasture - 1972
Pasture - 2006
Cropland - 1972
Cropland - 2006
-
500,000
1,000,000
1,500,000
Hectares of Agricultural Lands


Pesticide Use: Predictions vs. Survey
80%
60%
40%
20%
0%
-20%
-40%
-60%
PLUARG - Lower - 1971-2000
PLUARG - Upper - 1971-2000
Pesticide Survey - 1983-2003
-1.1%
19.5%
-40.4%
28.7%
61.2%
-49.0%
8.8%
30.0%
-51.8%
Herbicide
Fungicide
Insecticide

Predictions vs. Trends

- Agricultural land predictions fairly accurate
- Change in pasture not examined
- Assumed livestock would increase
- Pesticide use predictions assumed no change in practices
  - Programs put in place as a result of PLUARG
  - Food Systems 2002, Integrated Pest Management, prices, Environmental Farm Plans

Conclusions

- Need to look at long term changes on land and in lakes to understand environmental trends
- Agriculture's effects on water quality are changing as agriculture changes
- Changes in agriculture not always what the public perceive them to be
- Changes in production respond to consumers, marketplace and food system