Soybean Crops in Canada:
A case study on Sustainability in Agricultural Systems

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Soybean Crops in Canada

Market size

- 3.0 million acres of which 75 % are grown in Ontario
- Provincial Breakdown
  - Manitoba 300,000 Ac.
  - Ontario 2,150,000 Ac.
  - Quebec 550,000 Ac

Crop Rotations in Ontario

Cash crop - cropping systems

- Corn-Soy-Wheat
- Soy-Wheat-Soy
- Corn –Soy- Corn

WHY ROTATE???

Crop Rotations in Ontario

Why Rotate??

- Improves Soil Tilth and soil organic matter
- Reduces Insect and Disease pressure
- Spreads risk for markets and weather
- Reduces weed resistance and pressure
- Reduces soil erosion
- Nutrient balancing

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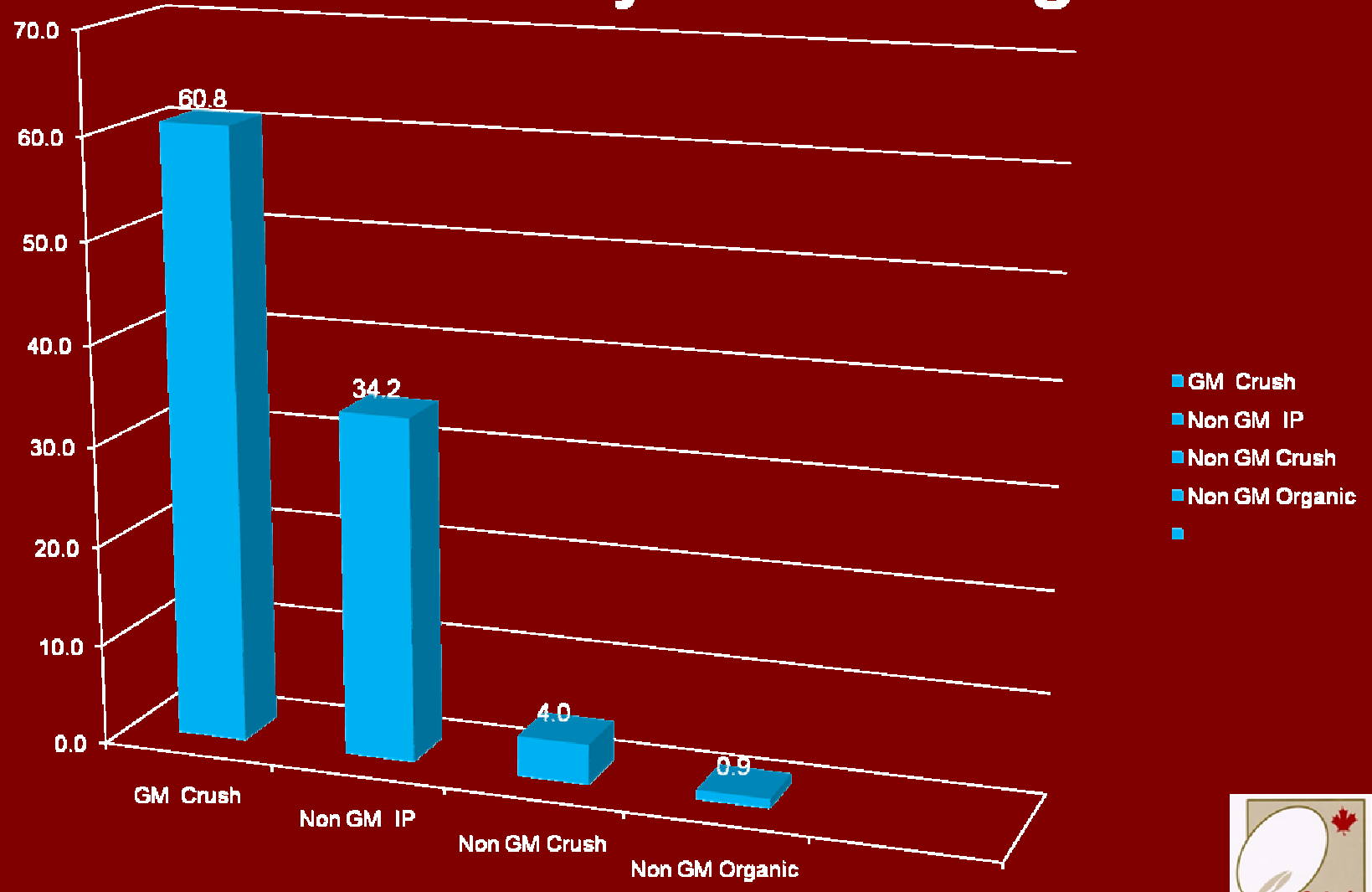
Ontario Market Segmentation

- 4 different markets segmentations

- GM Crush market (15,000 farms)
- Non-GM Identity Preserved (4,000 farms)
- Non- GM Crush (850 farms)
- Non-GM Organic (150 farms)

Ontario Soybean Acreage



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Soybean GM Crush

Chronology:

- GM soybean varieties introduced to market in 1997 – herbicide tolerant
- Currently achieved over 60% of market share in Ontario
- Rapid adoption mainly attributed to ease in production
  - Improved weed control
  - No-till planting
  - Reduced fuel costs

Identity Preserved (IP)

Chronology:

- Currently has about 35% of the Ontario Market
- We are the best in the World
- Export markets (especially EU & Japan) require non-GM soy for premium of $0.75 - $4.00/bu to producers

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Identity Preserved (IP)

- Identity Preservation (IP) process necessary to ensure specialty food export markets of non-GM
- Canadian Identity Preservation Recognition System (CIPRS) introduced in 2004
- Key Food Products: Tofu, Miso, Soymilk

Organic Non-GM Soybeans

- Very few farms (150-180) are certified organic despite high premiums of $20 + per bu.
- Soybeans are the largest Organic crop grown in Ontario (<20,000 ac)
- Most of the crop is exported to EU and Japan or used for domestic Soyfoods
- Higher carbon footprint - tillage

Soybean Sustainability

Opportunities:

New traits to assist in sustainability

- Drought tolerance
- Heat tolerance / Cold tolerance
- Disease resistance (Leaf and root diseases)
- Insect resistance (Aphids, Bean leaf beetle)
- Inoculants “messaging systems”
- More effective N-fixing bacteria strains
- New healthy oil and protein profiles

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Soybean Sustainability

$N_2 \longrightarrow NH_3$

No-Till Soybean Production

No-Till Soybean Production

No-Till Soybean Production

- Tillage

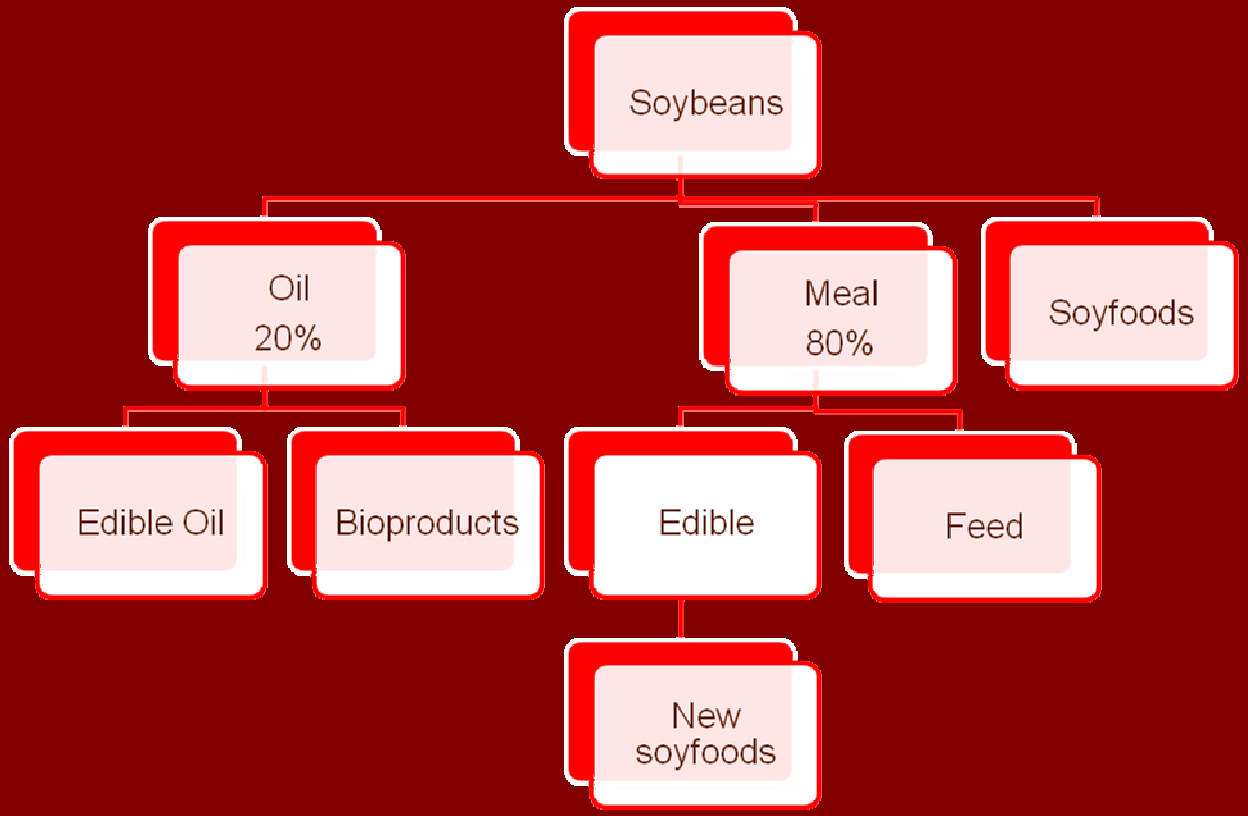
  55% of soybeans are no-till

  An additional 15-20% are minimal tillage

  This saves a lot of Fuel, Time, and Water.

No Genetic Drift

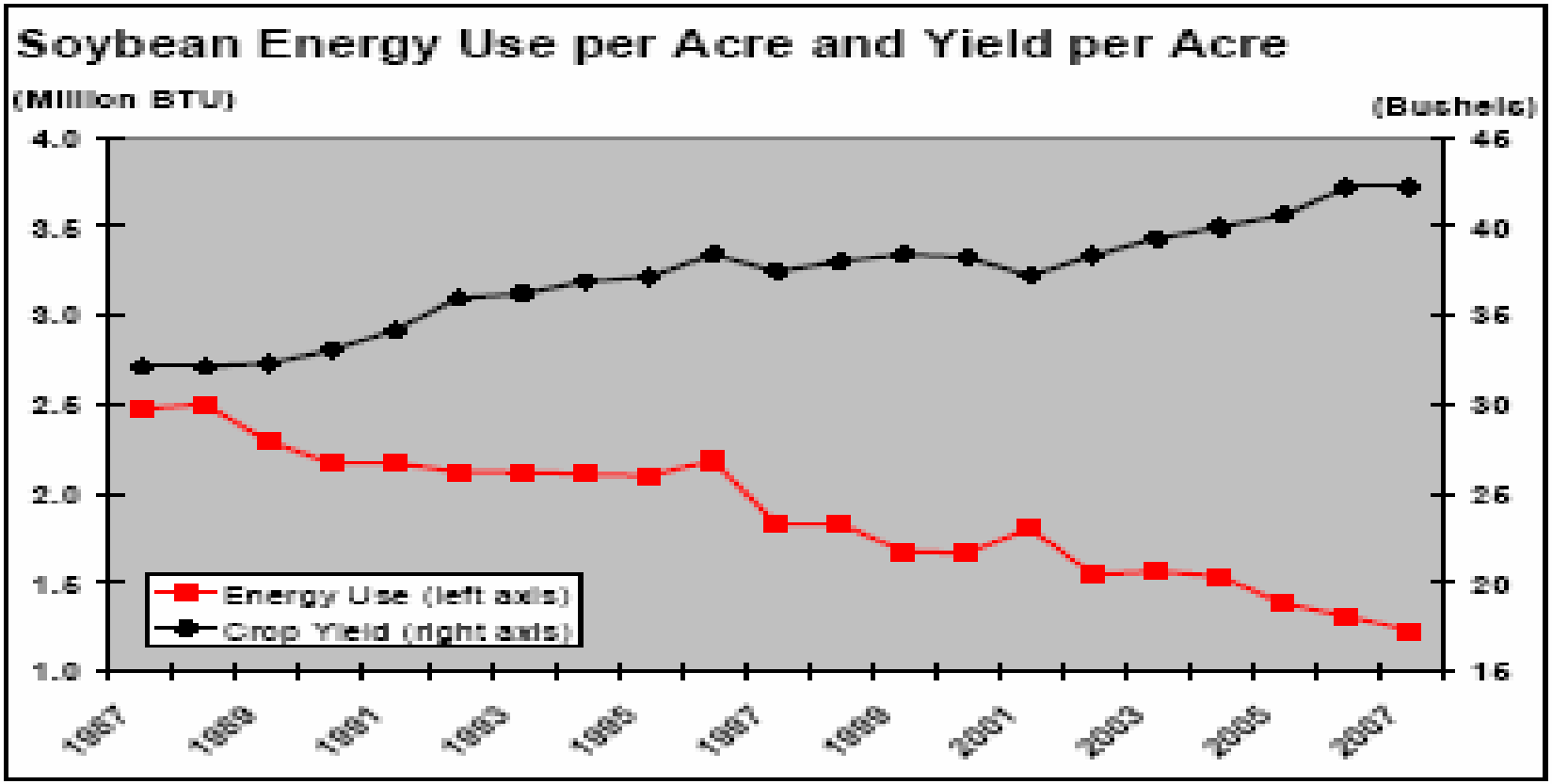
101+ Uses for Soybeans Food and Feed and Fuel



Petroleum oil replacement

Ford Soybean Concept Car

Woodbridge Foam
2008 Ford Escape
Hybrid


Soybean Energy Use per Acre and Yield per Acre
(Million BTU)
(Bushels)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
45
40
35
30
25
20
15
Energy Use (left axis)
Crop Yield (right axis)
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007

Summary

- Soybeans are a very sustainable crop
- Keys reasons are:
  - Reduced tillage and No-Till
  - Reduced herbicide use
  - Nitrogen Fixation
  - Crop rotation Insects /disease
  - No genetic drift
  - Renewable C=C Petroleum replacement
  - Low carbon footprint crop

Thank You