

Phosphorous In Lake Erie

New Opportunities or More Problems for Ontario Farmers?



London, Ontario
January 27, 2016

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Ontario Federation of Agriculture

Challenges

- Same for ALL FARMERS
 - Profitability
 - Money
 - Economic Return



Policies and Solutions

- **Recognition of Farmers**
 - Carbon Sinks
 - P trading
 - BMP's (cover crops, drainage)
- **Long Term Research for Crop and Animal Production**
- **Policy Action**



Definition of a Farmer

- Subsistence
- Cash crop
- Corn, soybeans, wheat farmer
- Beef farmer, Pork producer
- Fruit and vegetable producer
- Egg producer
- Pineapple plantation
- Or.....



Definition of a Farmer

- Manager of carbon and nitrogen cycles with the water cycle to produce starch, oil, protein, fuel, fiber and energy for the world.

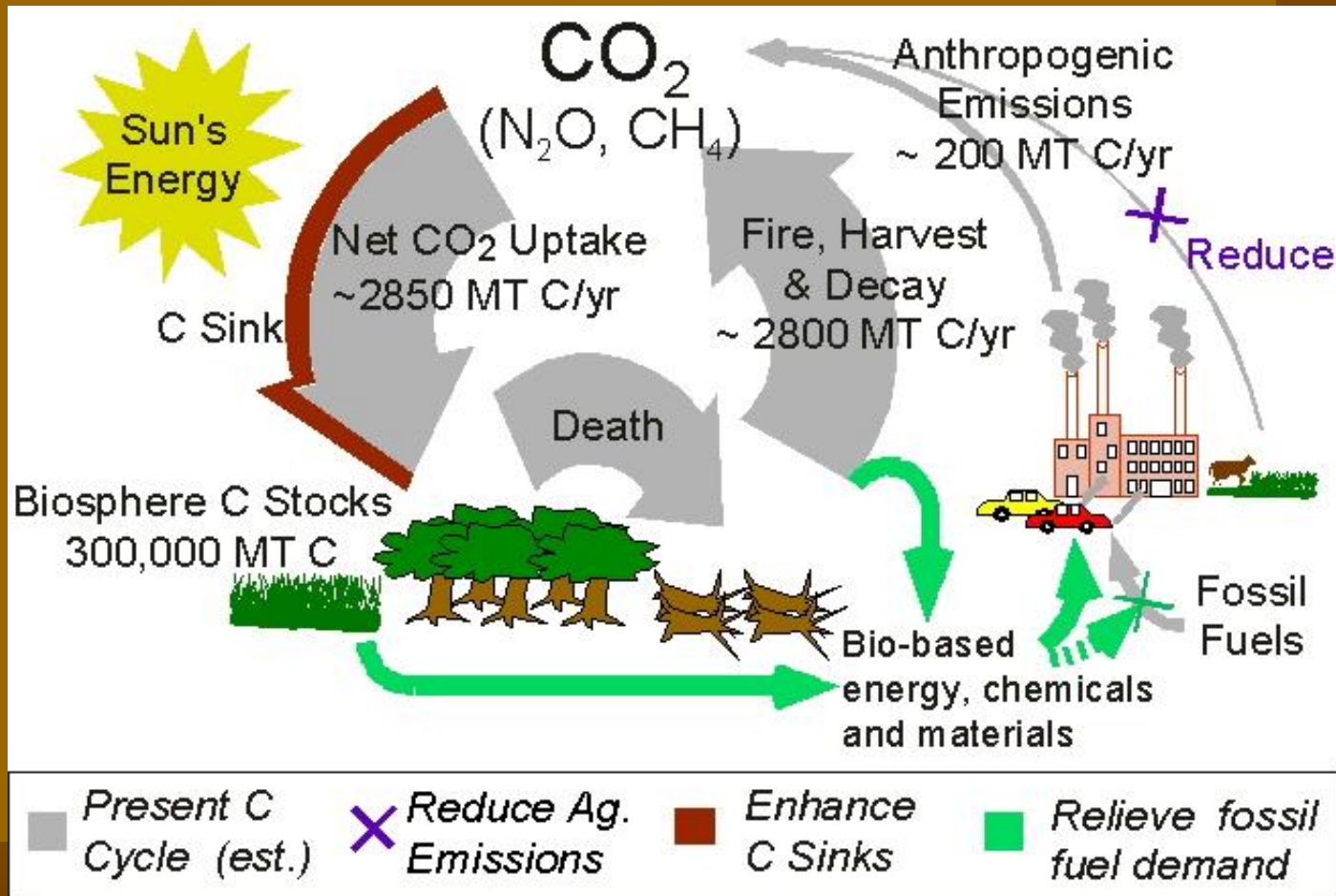


Definition of a Farmer

- Manager of carbon and nitrogen **and Phosphorous** cycles with the water cycle to produce starch, oil, protein, fuel, fiber and energy for the world.



The Biosphere



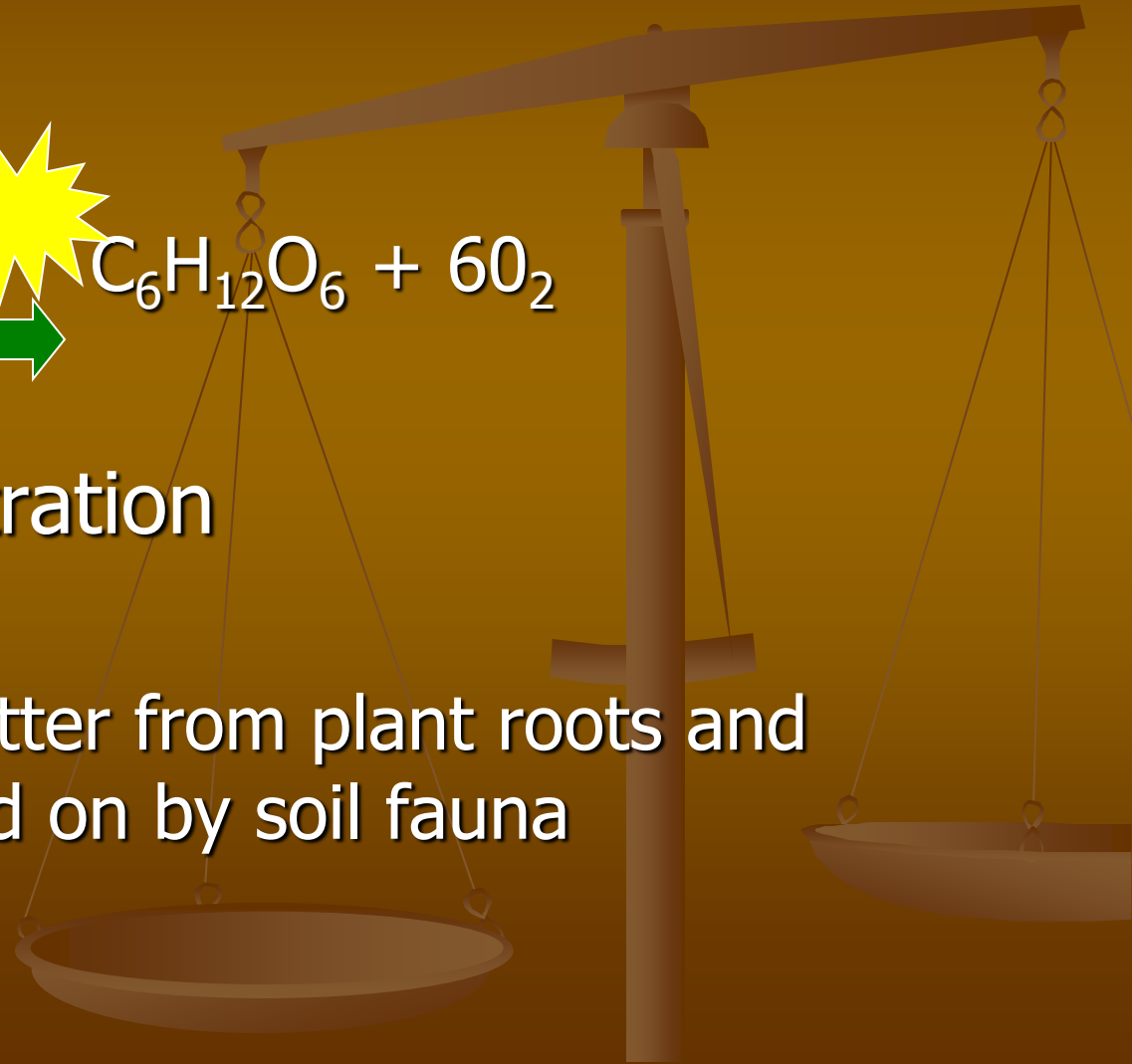
Capturing Environmental Value

- Photosynthesis



- Carbon Sequestration

- Plant material
 - Soil organic matter from plant roots and residues worked on by soil fauna

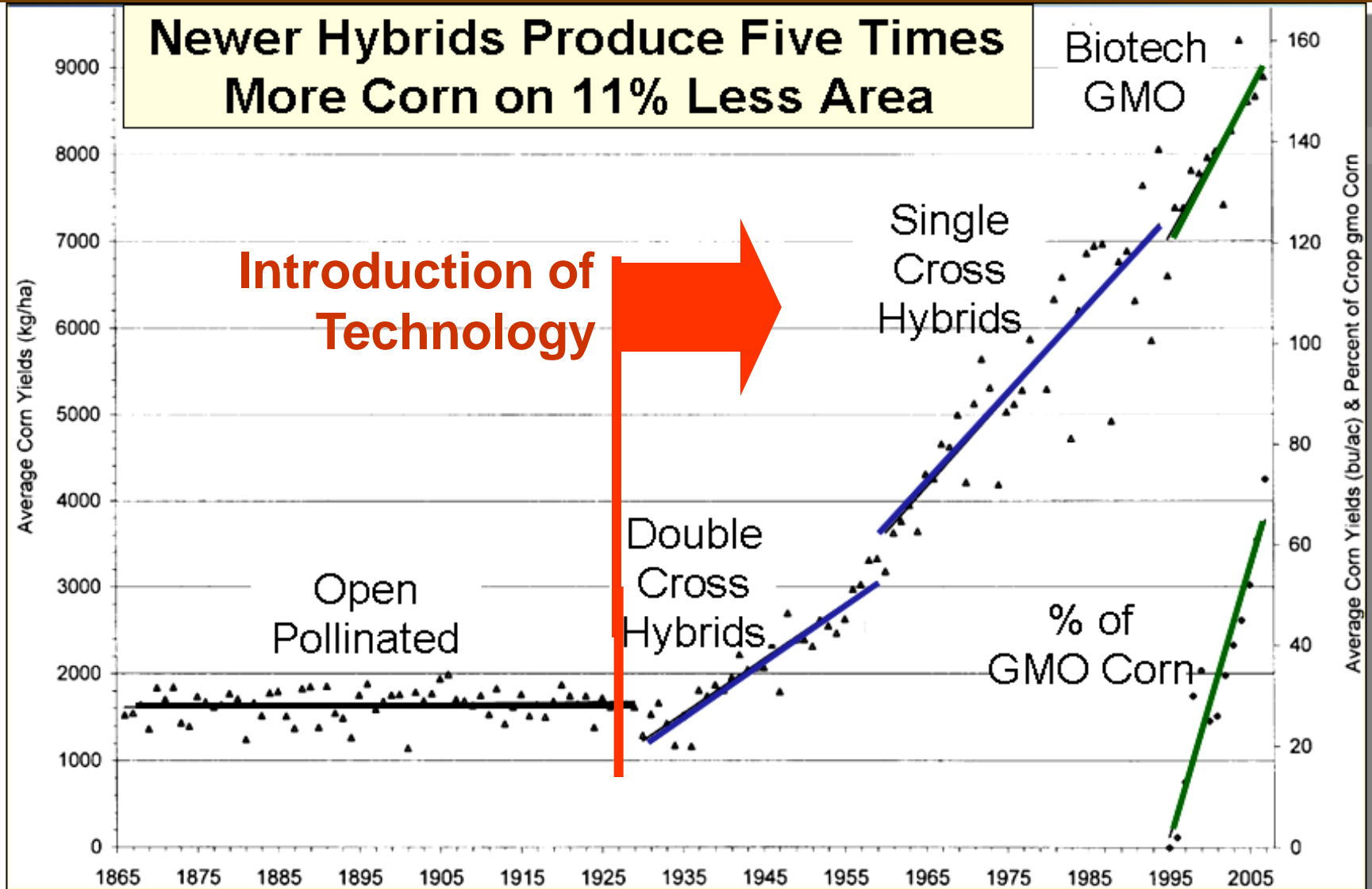


Definition of a Farmer

- Farmers LIVE the cycles and impacts of policy.

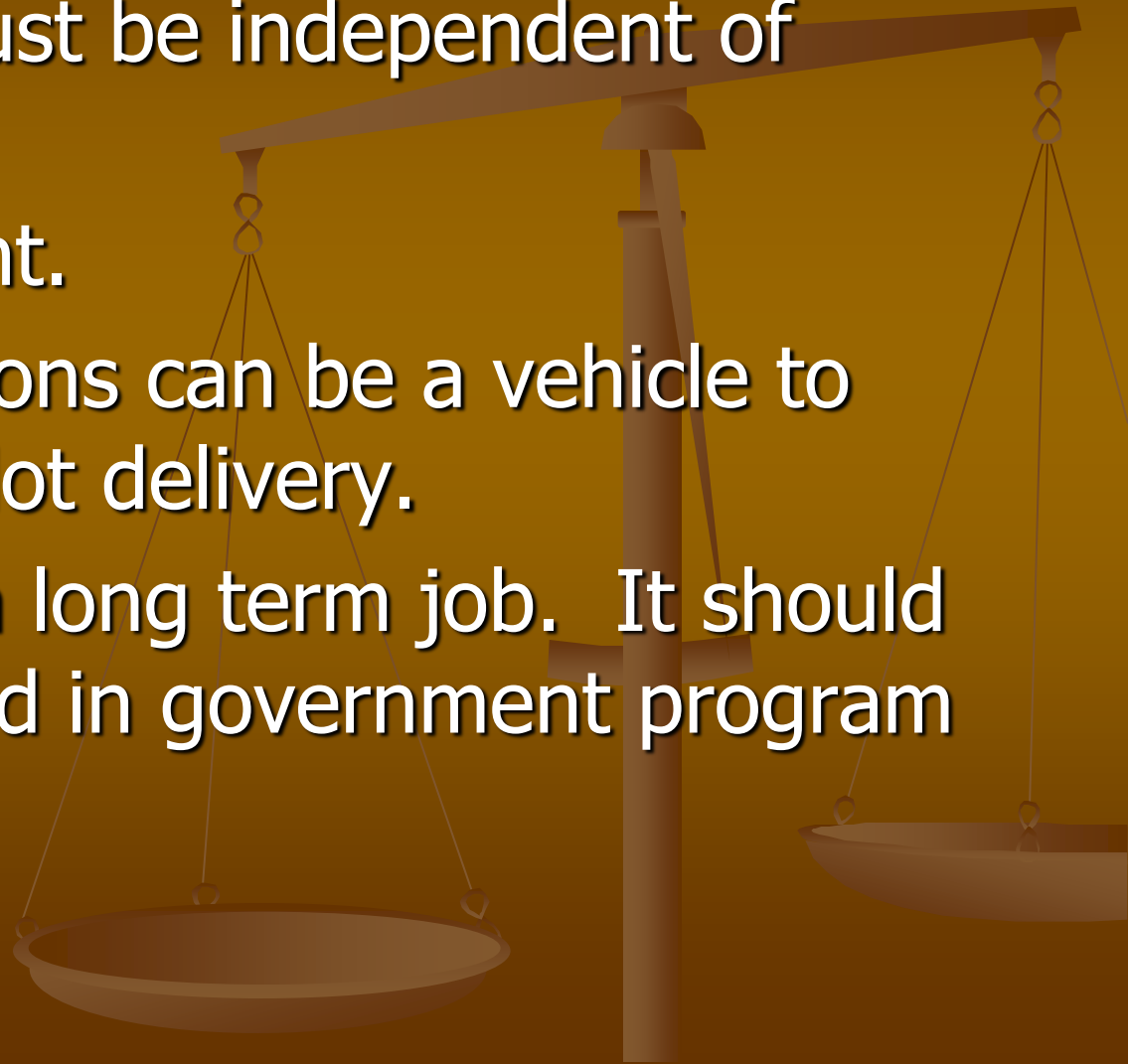


Long Term Research



Policy Action on the Ground

- Policy action must be independent of scale.
- All farmers count.
- Farm organizations can be a vehicle to program and pilot delivery.
- Ag research is a long term job. It should not be measured in government program length.



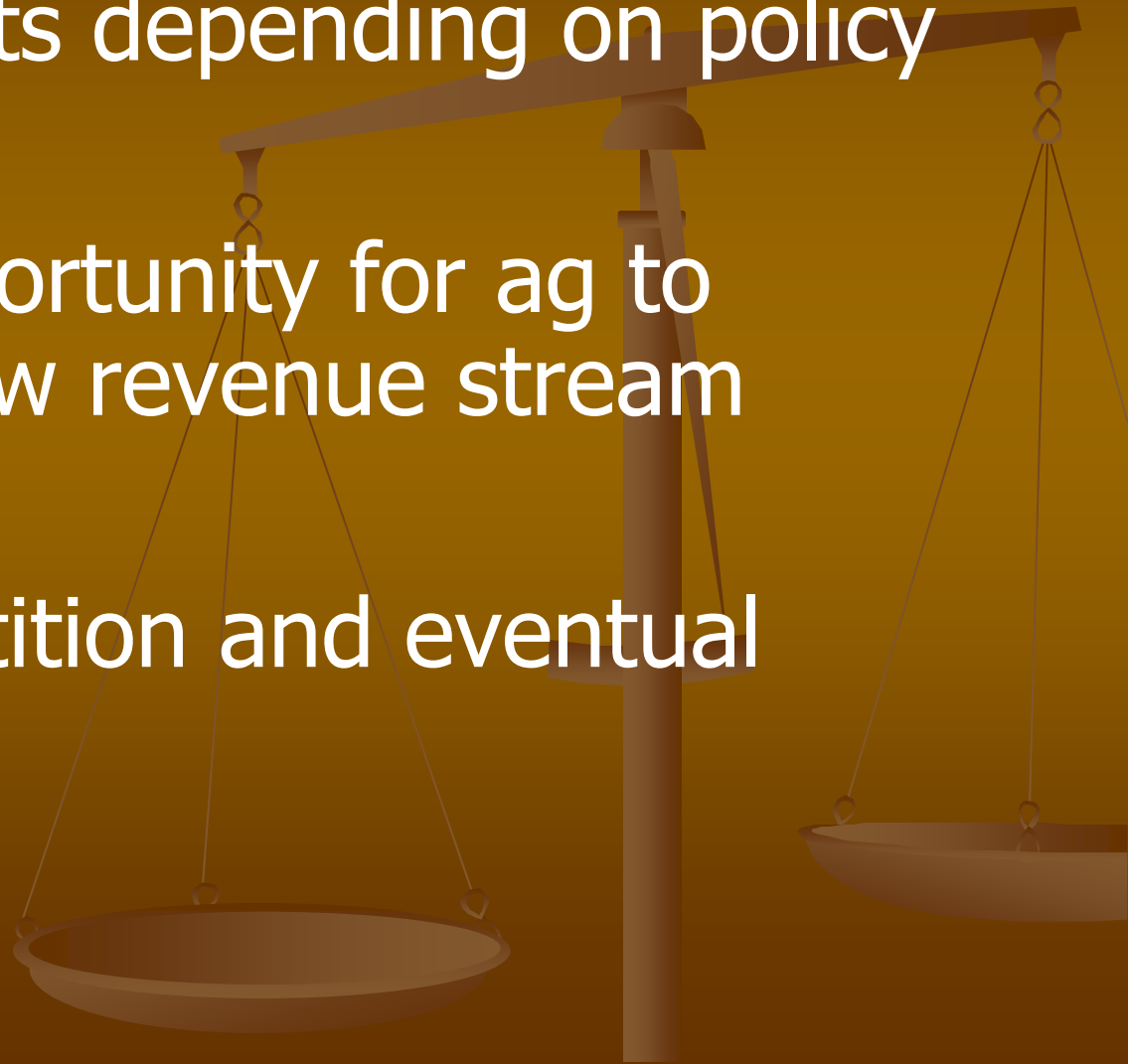
Why do I care about policy?

- Policy makes markets
 - Voluntary
 - Compliance
 - Environmental Goods and Services
- Good policy incents good actions
 - Good investment by everyone (corporations, institutions, donor countries, international organizations)



Ag Sector Impacts (Why care?)

- | Increased costs depending on policy
- | Voluntary opportunity for ag to establish a new revenue stream
- | Global competition and eventual harmonization



What Does Sustainability Look Like?

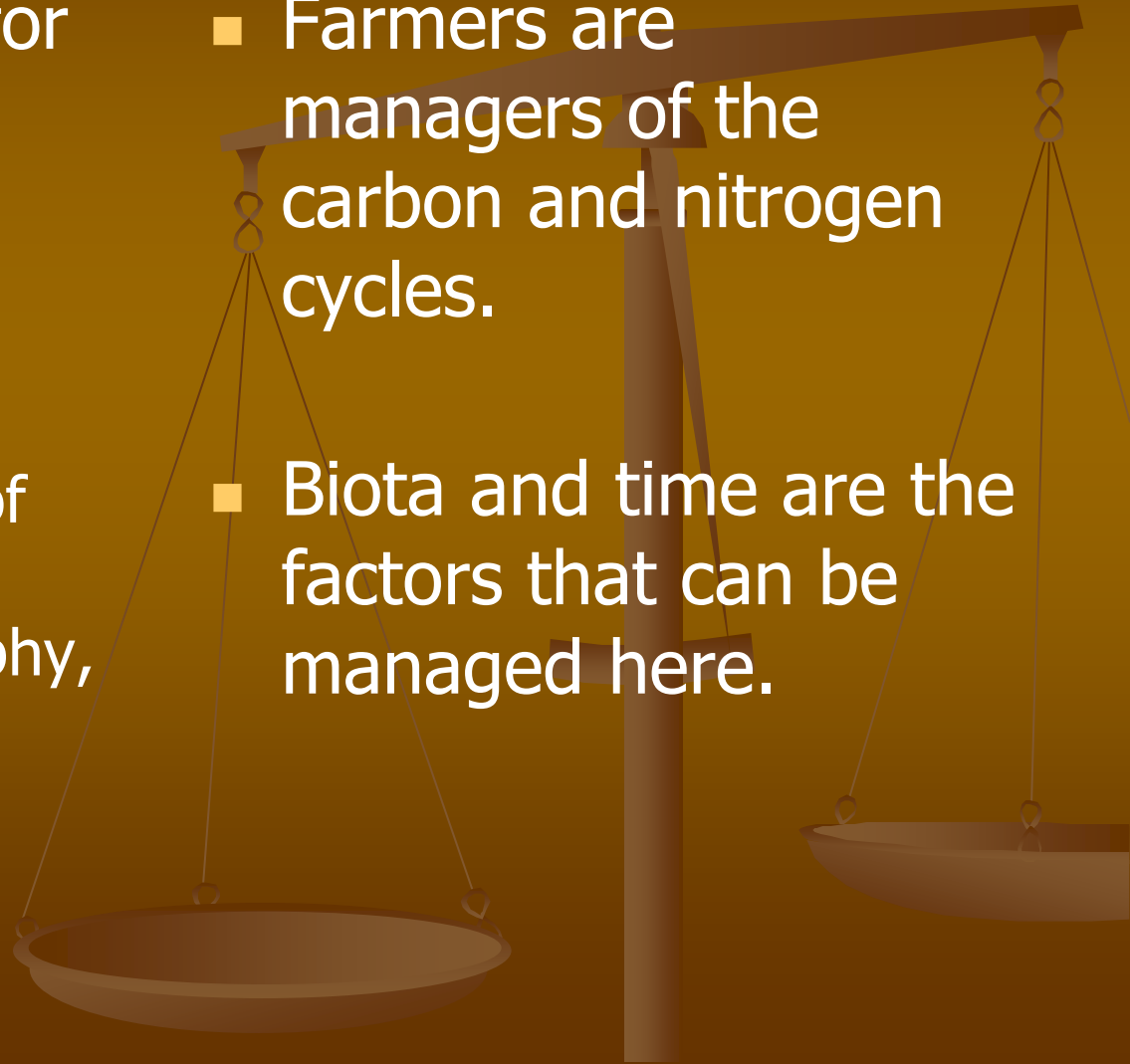
November 2008



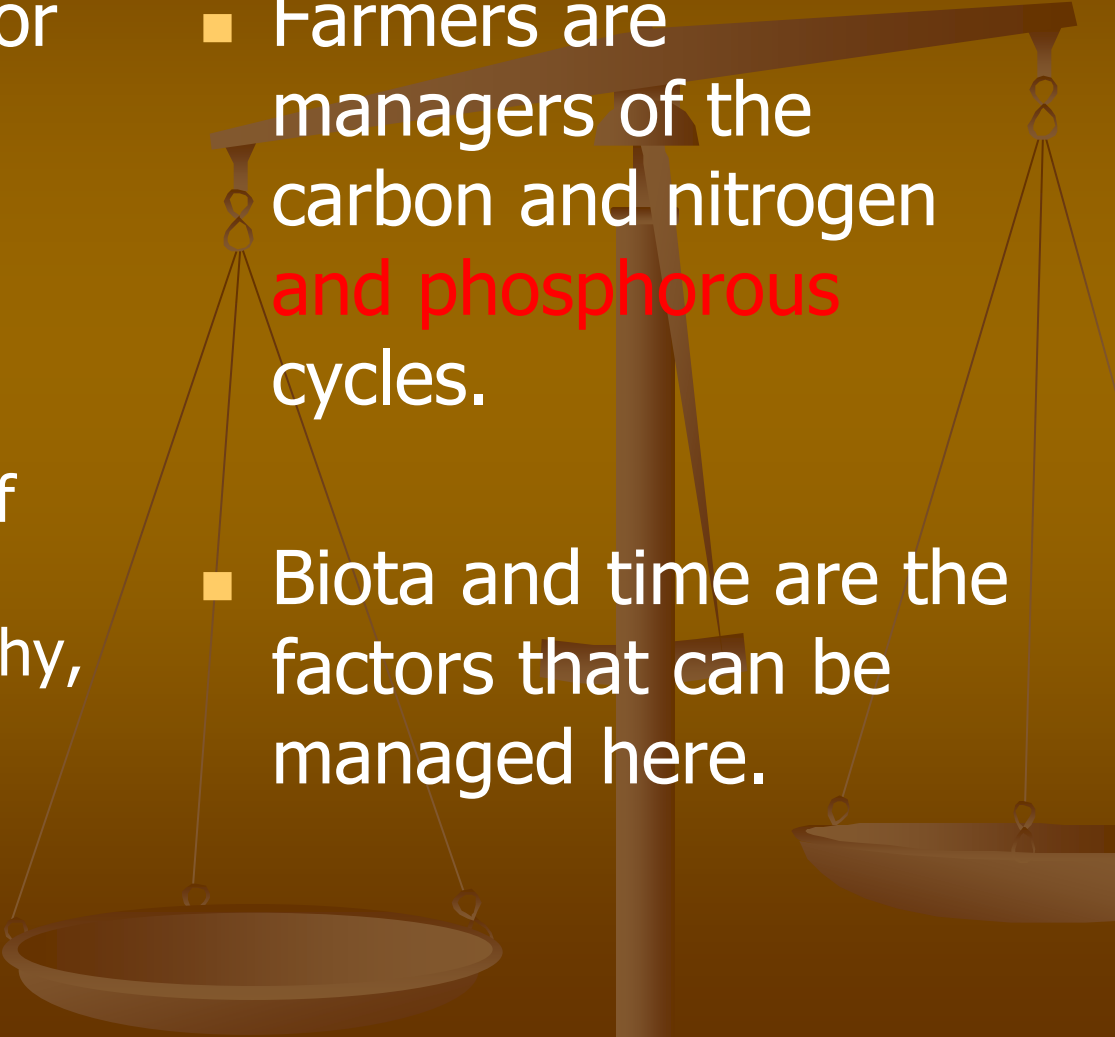
2008 soybeans, 2009 winter wheat, 2007 corn cobs

Soil Equation to Soil System

- Jenny's Equation for soil formation
 - $\text{Soil} = f(\text{cl}, \text{pm}, \text{r}, \text{o}, \text{t})$
 - Soil is a function of climate, parent material, topography, biota and time
- Farmers are managers of the carbon and nitrogen cycles.
- Biota and time are the factors that can be managed here.



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- 

SOIL QUALITY

Capacity of a soil to:

Protect environmental quality

Sustain plant and animal productivity

Promote human health

Protect water quality

Protect air quality

Resist soil erosion

Protect biodiversity

Support plant prod & quality

Support animal prod & quality

Food safety and composition

Soil Properties

- nutrients
- water
- toxicants
- pathogens
- sorption
- precipitation
- decomposition

- nutrients
- water
- toxicants
- pathogens
- sorption
- gas exchange

- organic matter
- structural stability
- water
- soil roughness
- texture

- active o.m.
- microbial abundance
- macrobial abundance
- water
- pathogens
- nutrients

- organic matter
- nutrients
- toxicants
- water
- pathogens
- structural stability

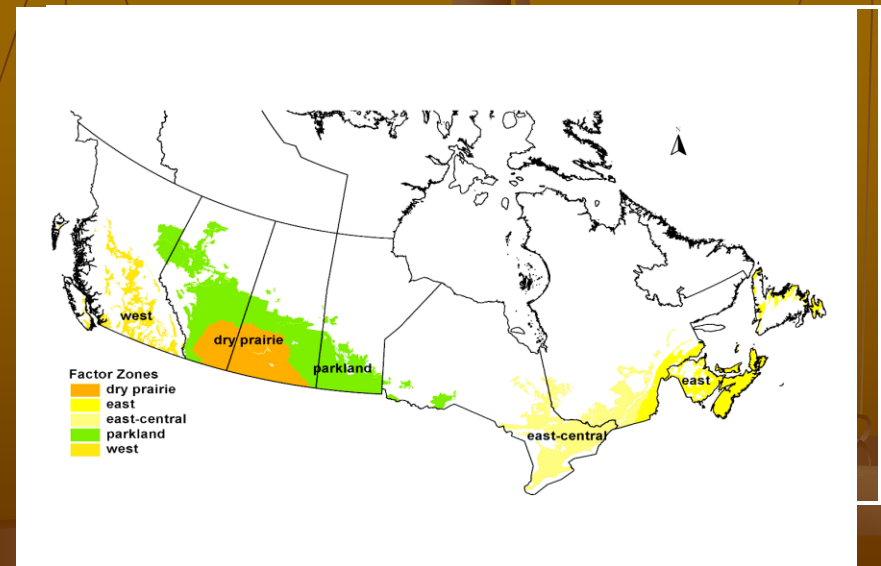
- organic matter
- nutrients
- toxicants
- water
- pathogens
- structural stability

- nutrients
- toxicants
- pathogens
- aesthetic relations

Tillage Protocol

- Variables required based on farm location / dominant soil zone:
 - Reduction Factor / Sequestration Factor For Relevant Till Practice in Relevant Area and Geographic Zone

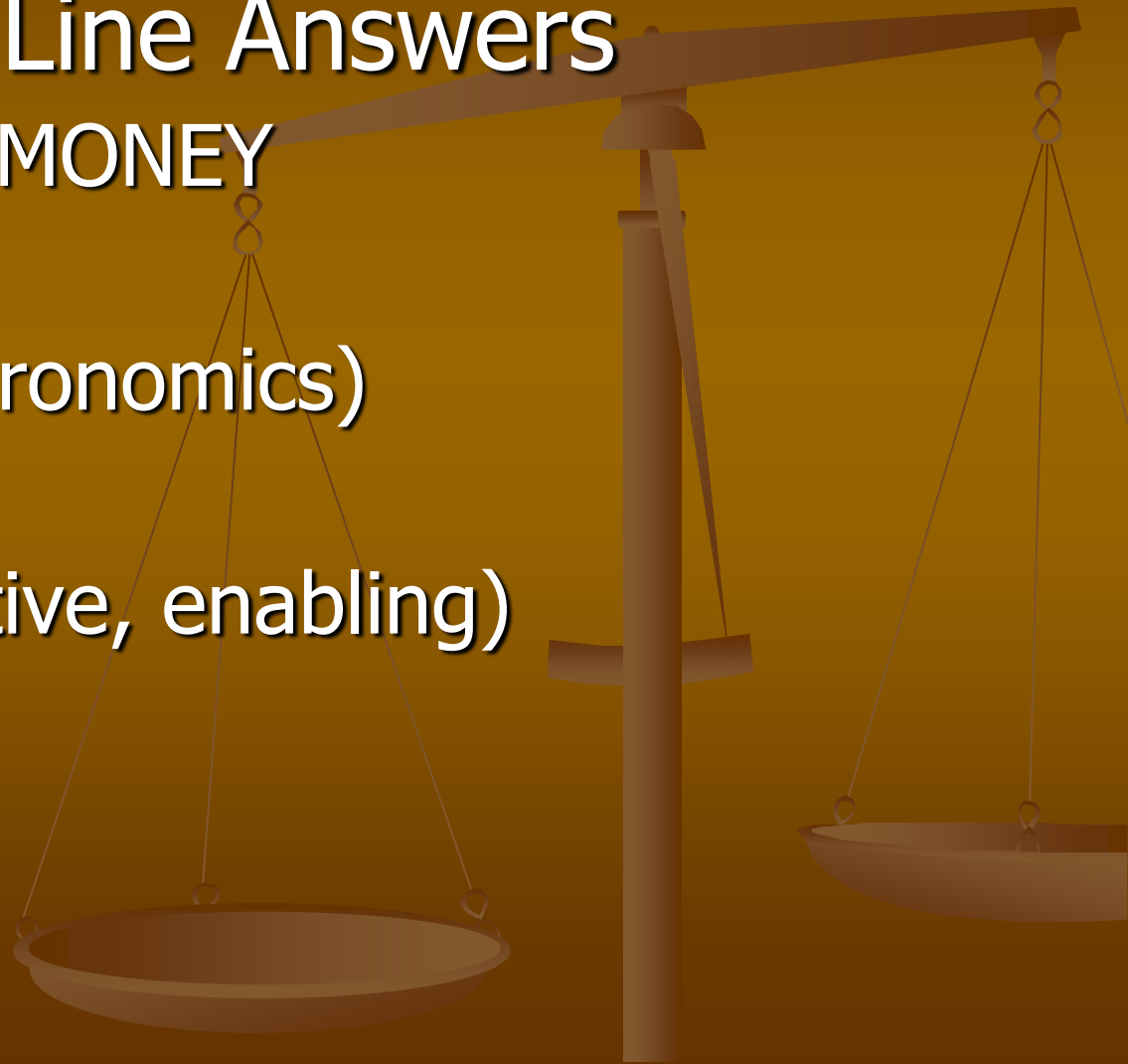
Region	Tillage Change	10 year CO ₂ E (t CO ₂ E / ha)	Energy (t CO ₂ E / ha)
East	FT to NT	0.25	0.1649
	FT to RT	0.20	0.1186
	RT to NT	0.08	0.0463
	NT to FT	-0.25	-0.1649
	RT to FT	-0.20	-0.1186
	NT to RT	-0.08	-0.0463
East Central	FT to NT	0.41	0.1649
	FT to RT	0.16	0.1186
	RT to NT	0.26	0.0463
	NT to FT	-0.41	-0.1649
	RT to FT	-0.16	-0.1186
	NT to RT	-0.26	-0.0463



How do I move ahead? or “The Balance at the Farm Gate”

Triple Bottom Line Answers

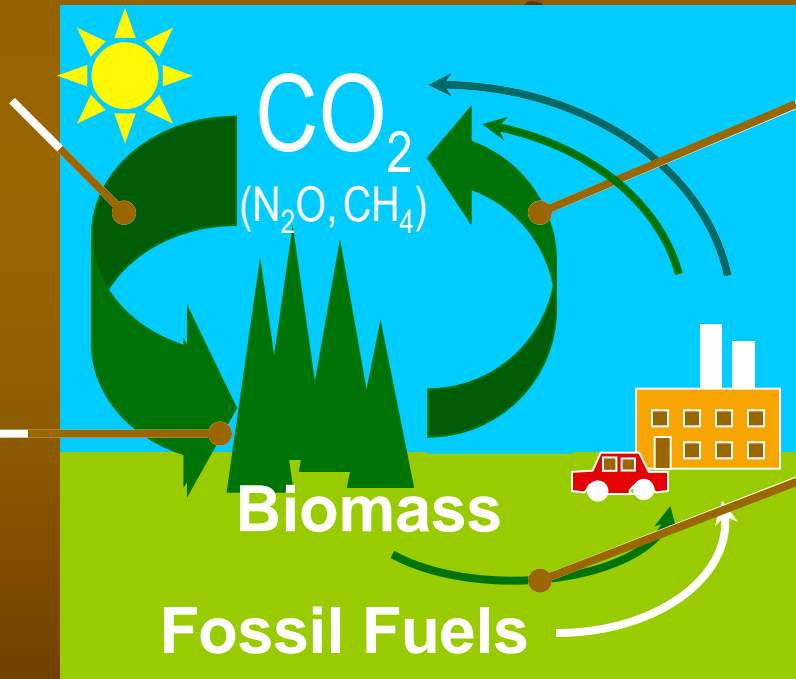
- SHOW ME THE MONEY
- KISS (logistics)
- Information (agronomics)
- Risk Mitigation
- Policy (competitive, enabling)



Capturing World's Green Advantage: Biosphere Solutions

... the improved management and use of our biological cycles to provide environmental values, energy, chemicals and materials (the Bioeconomy) in addition to food, feed and fibre.

SEQUESTER
Atmospheric C
& solar energy
into biomass.



REDUCE CH₄ &
N₂O associated
with biosphere
management

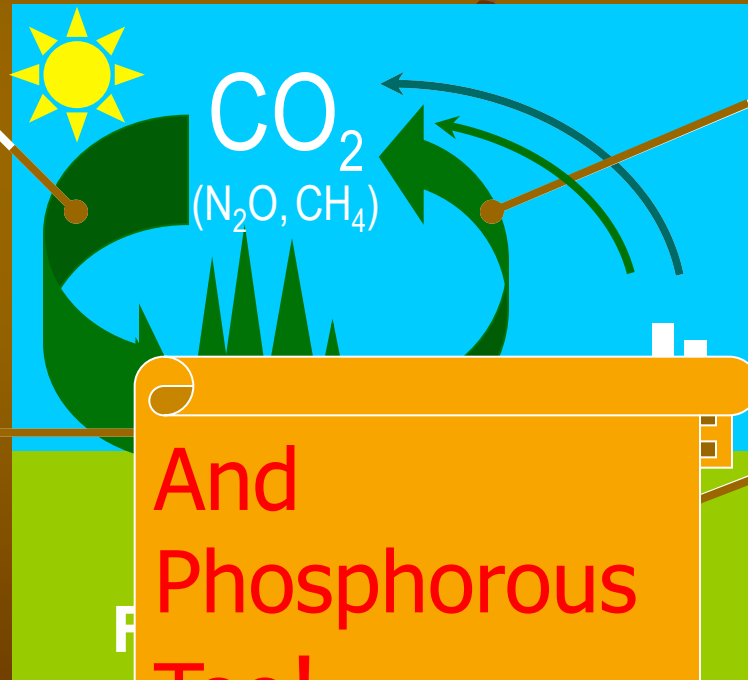
COMPLEMENT
fossil energy (&
chemicals, materials)
with biomass

ADAPT
biosphere to
changing climate
& atmosphere

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REDUCE CH₄ &
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COMPLEMENT
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with biomass

**And
Phosphorous
Too!**

ADAPT
biosphere to
changing climate
& atmosphere

Only Farmers, Foresters and Ranchers Can Do This!

Periodic Table of the Elements

1 H 1.01																	18 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.30											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (97.91)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.75	52 Te 127.60	53 I 126.90	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	57 La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po (208.98)	85 At (209.99)	86 Rn (222.02)
87 Fr (223.02)	88 Ra (226.03)	89 Ac (227.03)	104 Rf (261.11)	105 Ha (262.11)	106 Sg (263.12)												
58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (144.91)	62 Sm 150.36	63 Eu 151.97	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97				
90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237.05)	94 Pu (244.06)	95 Am (243.06)	96 Cm (247.07)	97 Bk (247.07)	98 Cf (251.08)	99 Es (252.08)	100 Fm (257.10)	101 Md (258.10)	102 No (259.10)	103 Lr (262.11)				



Thank you!

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