

Toward AgEnvironment



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Regional Approaches to Climate Change for Pacific Northwest Agriculture
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The Problem



“But though man cannot at his pleasure command the rain and the sunshine, the wind and frost and snow, yet it is certain that climate itself has in many instances been gradually changed and ameliorated or deteriorated by human action.”

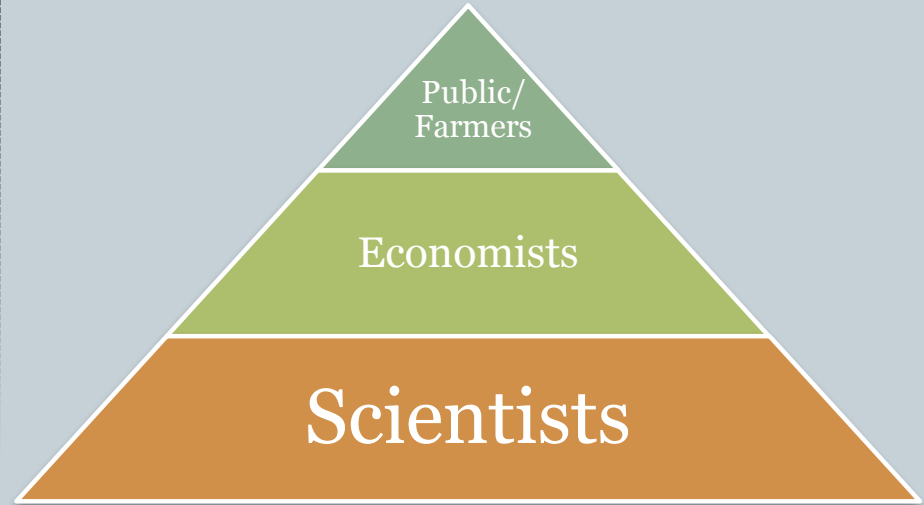
-George Perkins Marsh, Address delivered before the Agricultural Society of Rutland, 1847



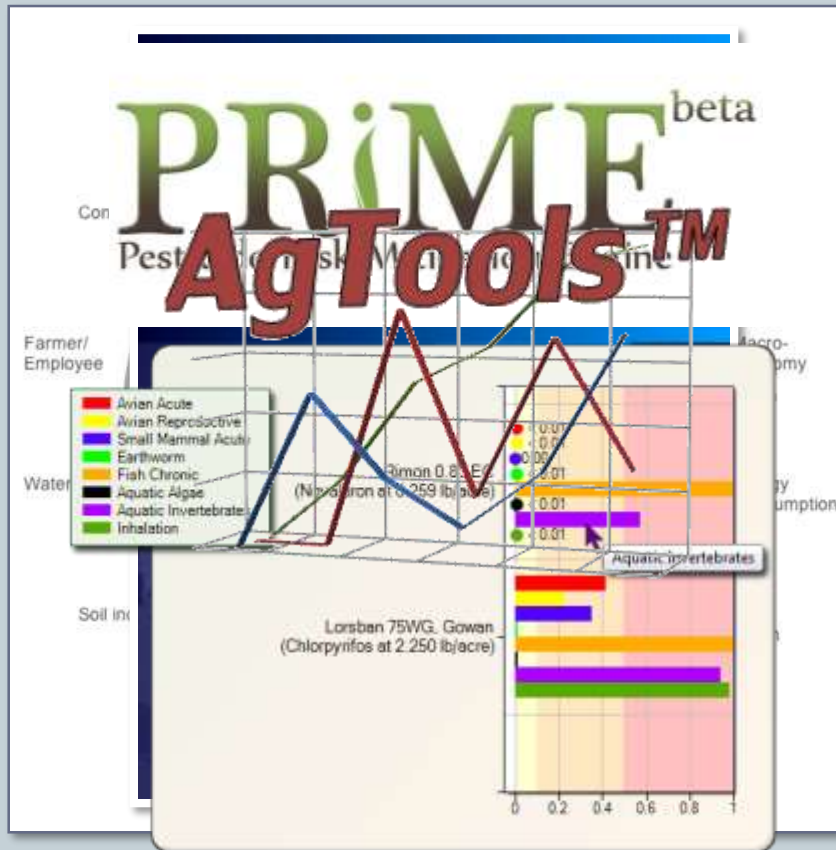
- Farmer’s decisions invariably alter the quality of the environment, but...
- We don’t really understand the full extent of environmental impacts that arise as a result of farmer decision-making.
- Impacts are difficult to monitor and track at the farm and regional scale.

Broader Impact

- **A tool for farmer decision-making**
 - AgTools™ has been developed to help farmers maximize on farm profitability; the goal of AgEnvironment is to create a tool which allows farmers to account for the environmental costs and/or benefits that arise for individual farming practices.
 - Standalone program for environmental accounting
- **Overcoming information disparity**
- **Climate change mitigation potential**
- **Understanding options for adaptation**



Current Tools



- AgBalance
 - BASF: The Chemical Company
 - Life Cycle Assessment
- FINPACK
 - University of Minnesota
 - Used by farmers in the Midwest
- PRiME
 - Oregon State University, Paul Jepsen
 - Impacts on biodiversity
- AgTools
 - Oregon State University, Clark Seavert and Susan Capalbo
 - AgProfit™, AgLease™, & AgFinance™

Research Questions



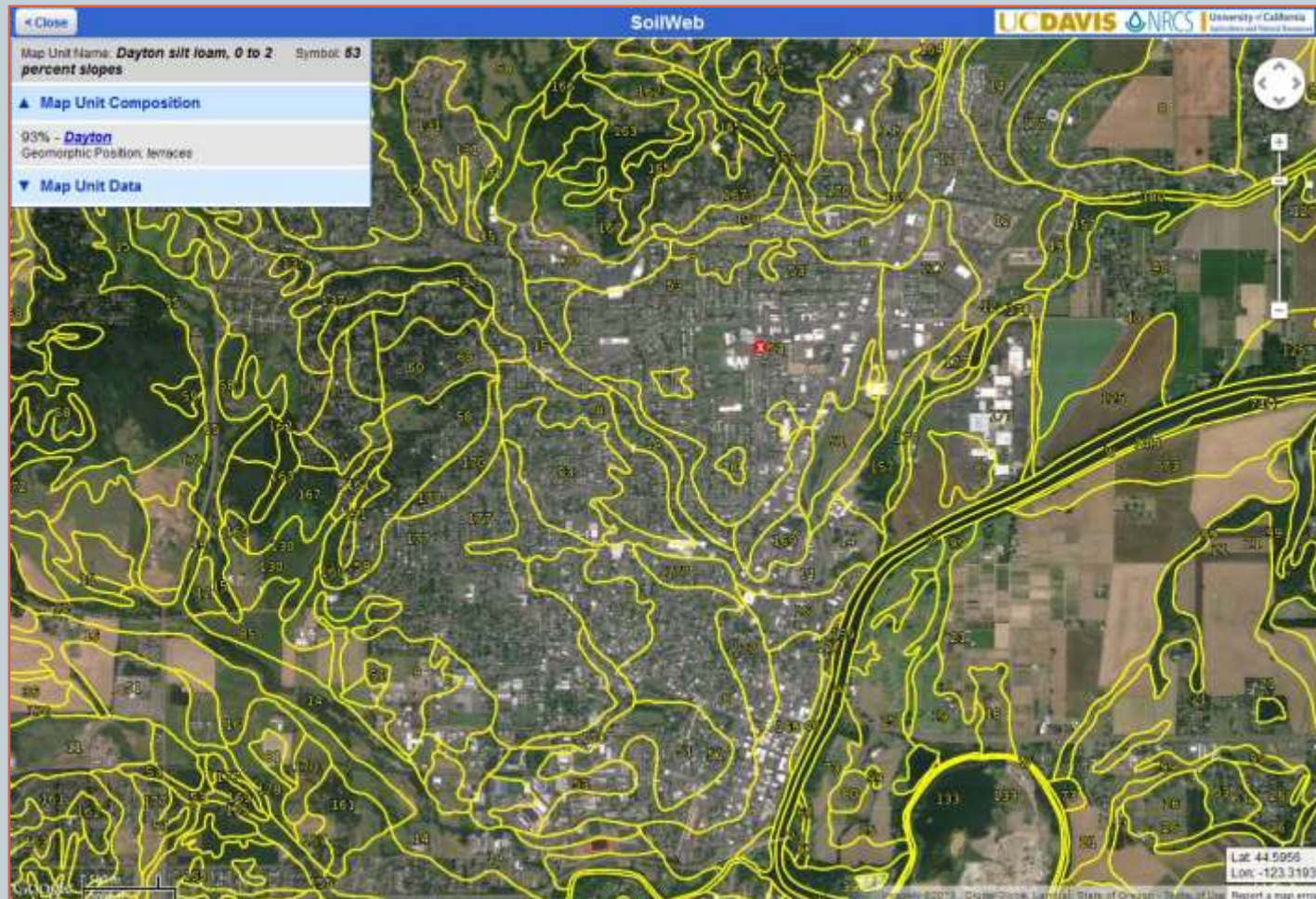
- 1) What are the overall environmental impacts of specific farming practices?
- 2) How do we quantify the environmental impacts so that they may provide robust predictions as to the possible environmental harms or benefits arising from agriculture?
- 3) To what scale can any environmental accounting software be extended while still providing robust results?

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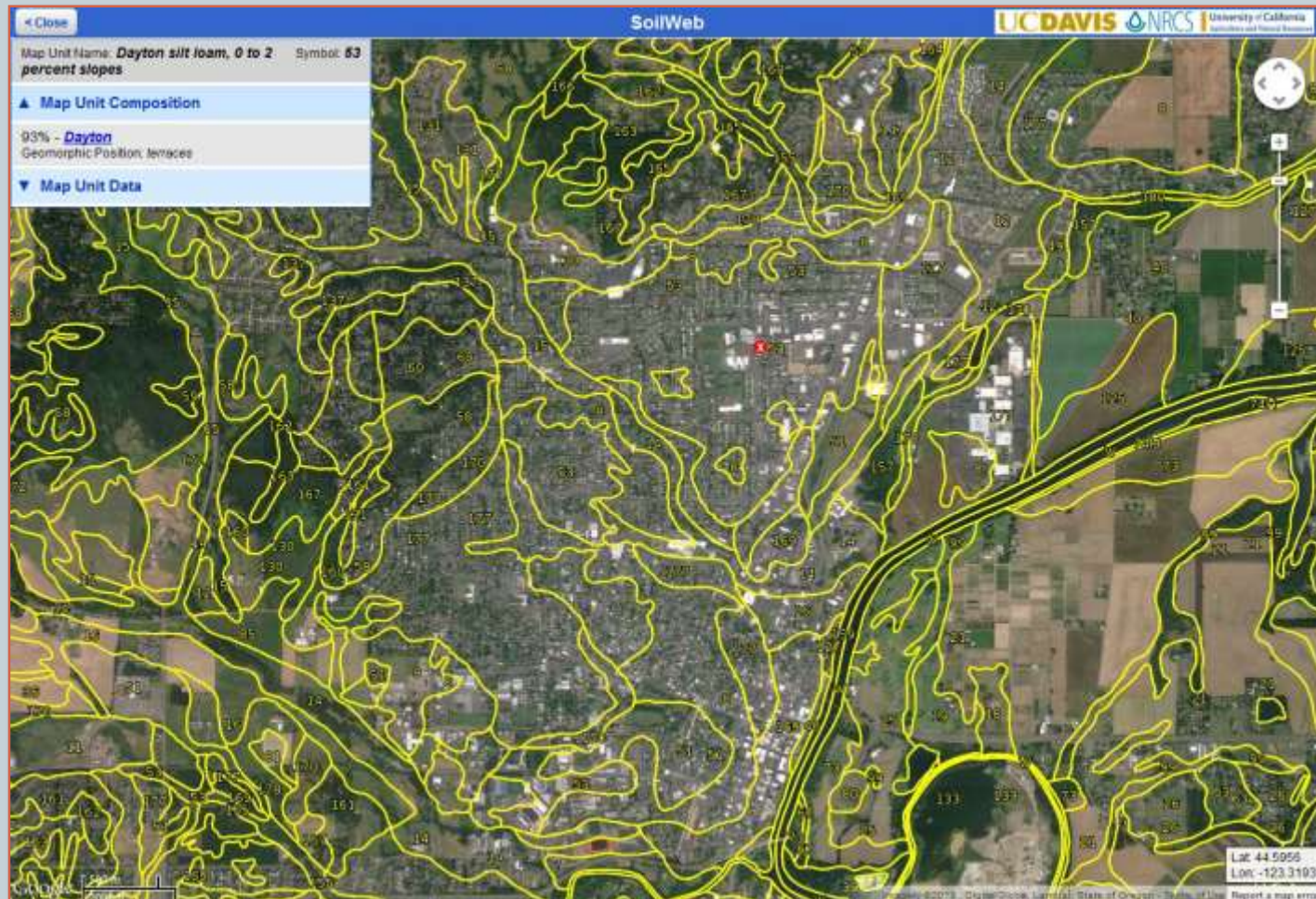


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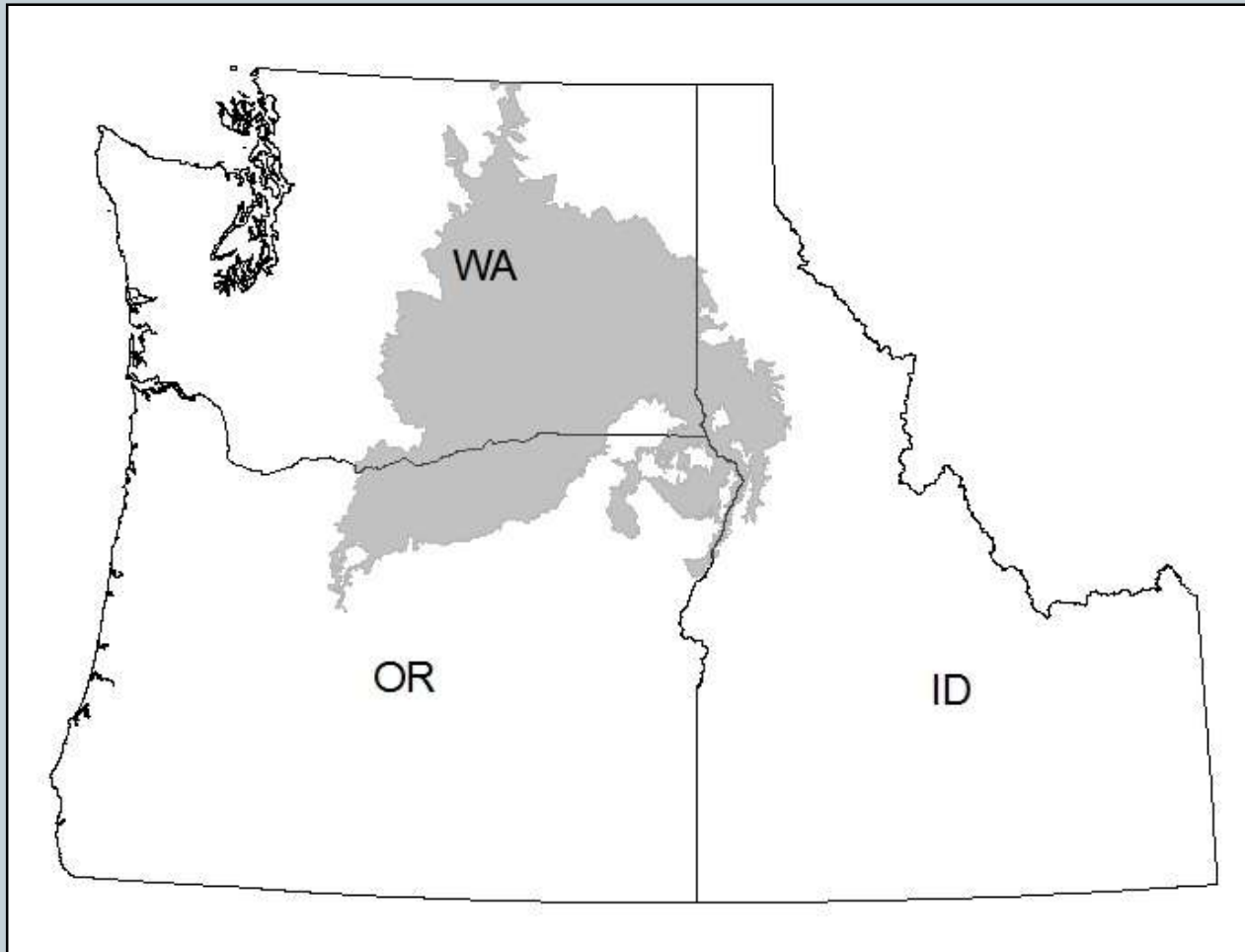
Research Questions



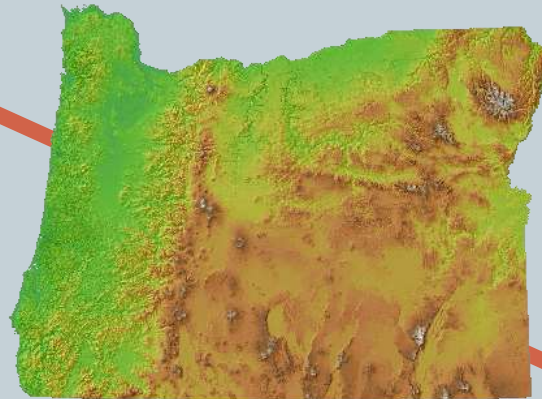
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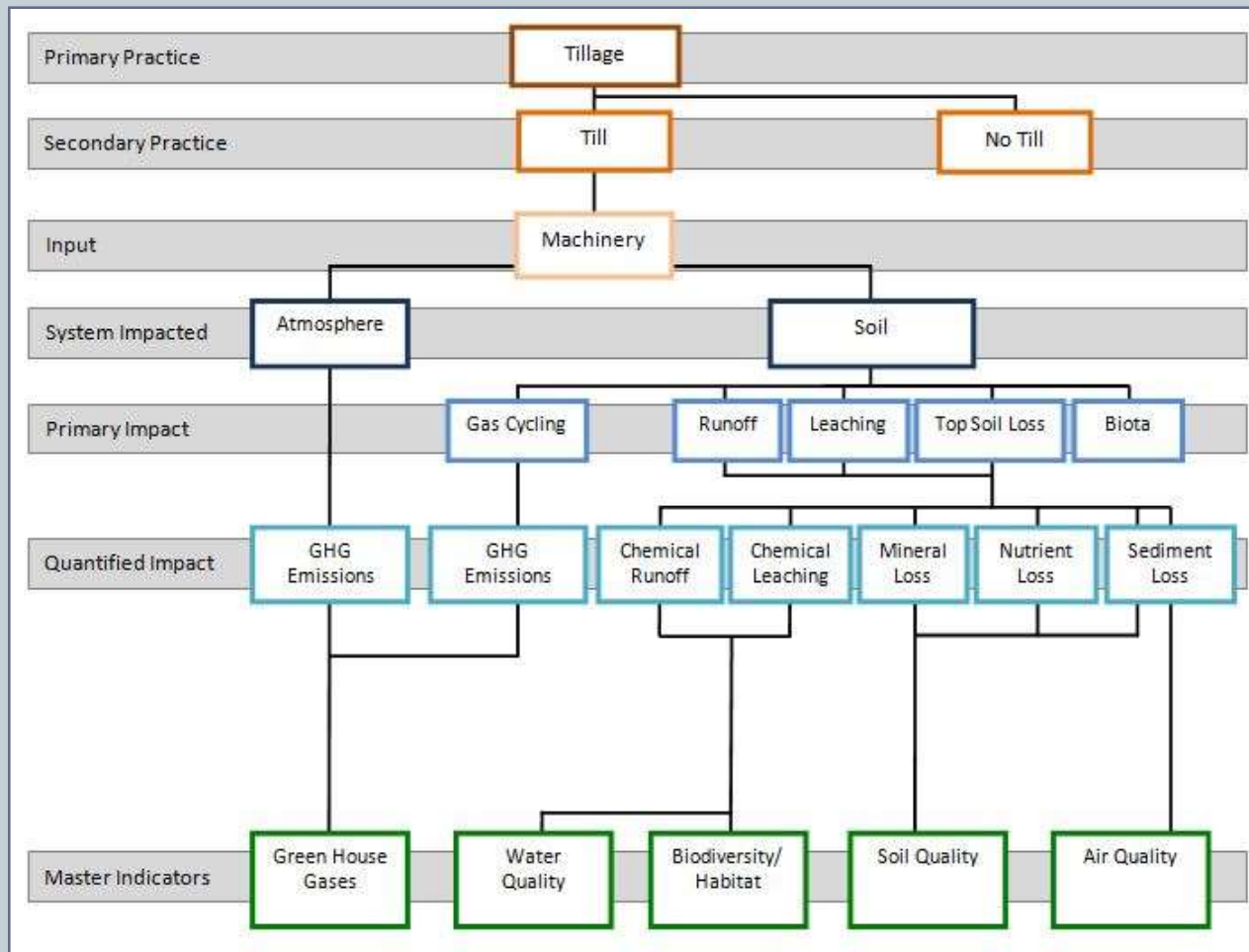


Methodology

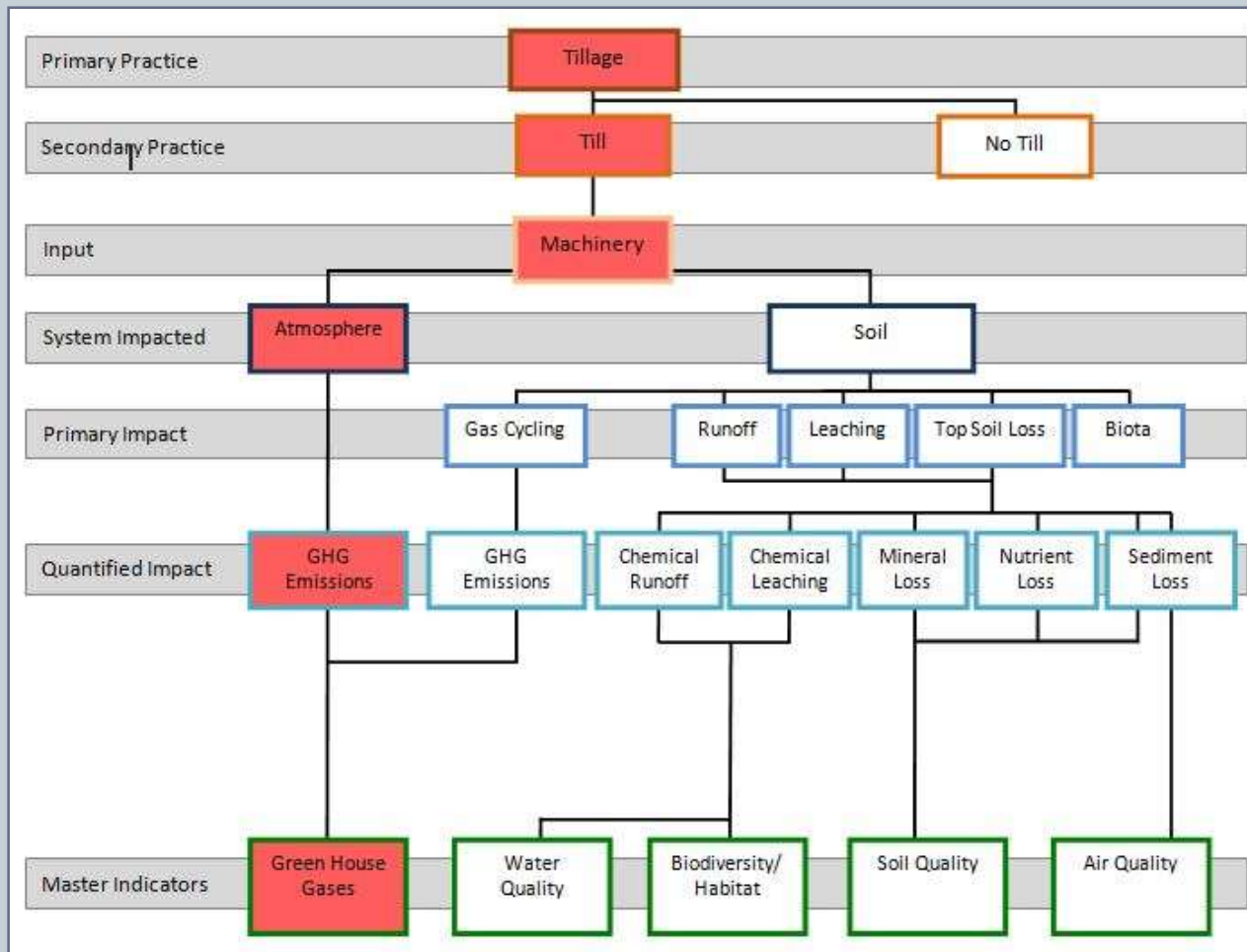


- Review literature
 - Current tools
 - Science-based literature
- Construct externality pathways
- Quantify specific impacts
- Aggregate quantified impacts to a set of environmental indicator indices
- Understand how the economic models couple with the environmental models

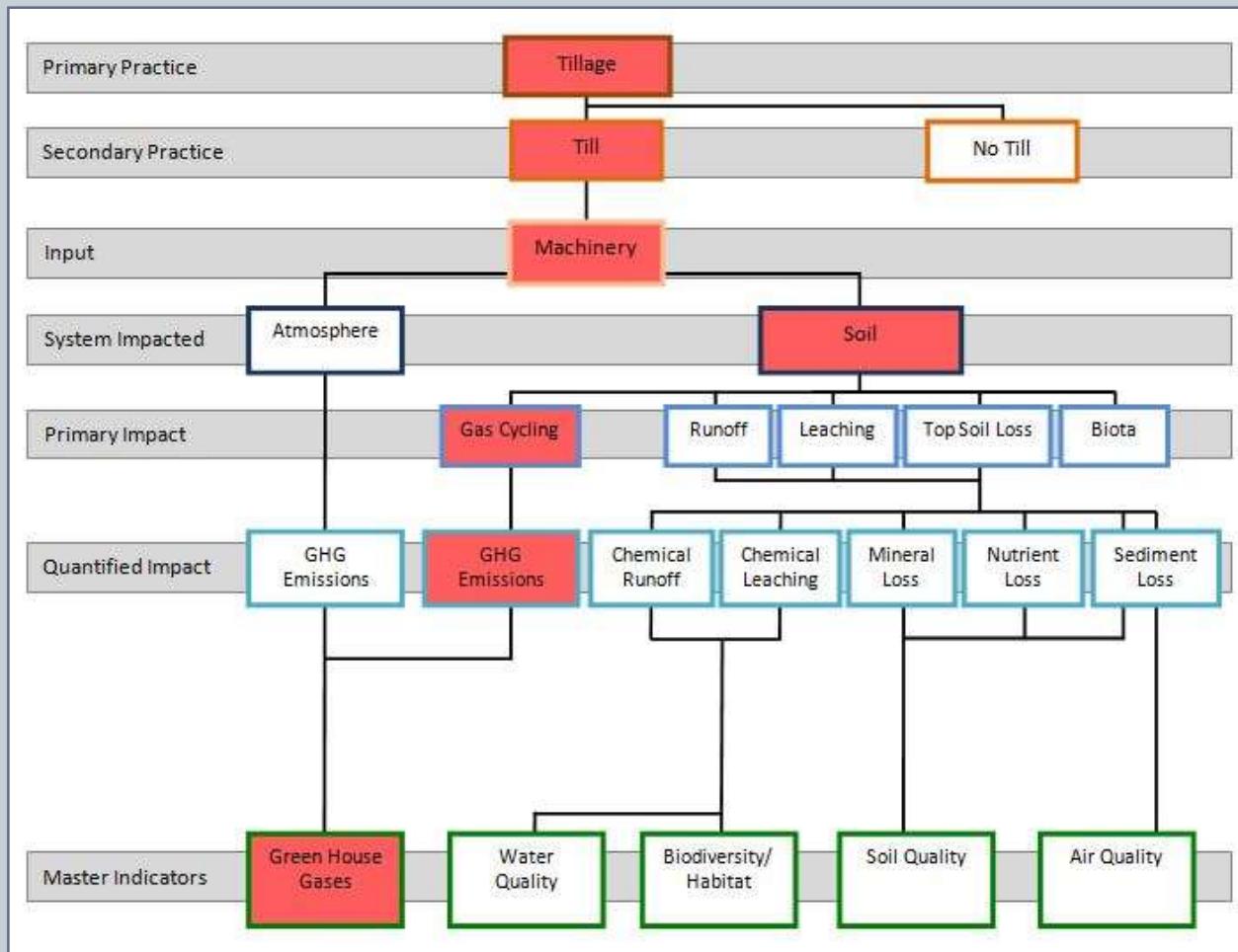
Externality Pathway



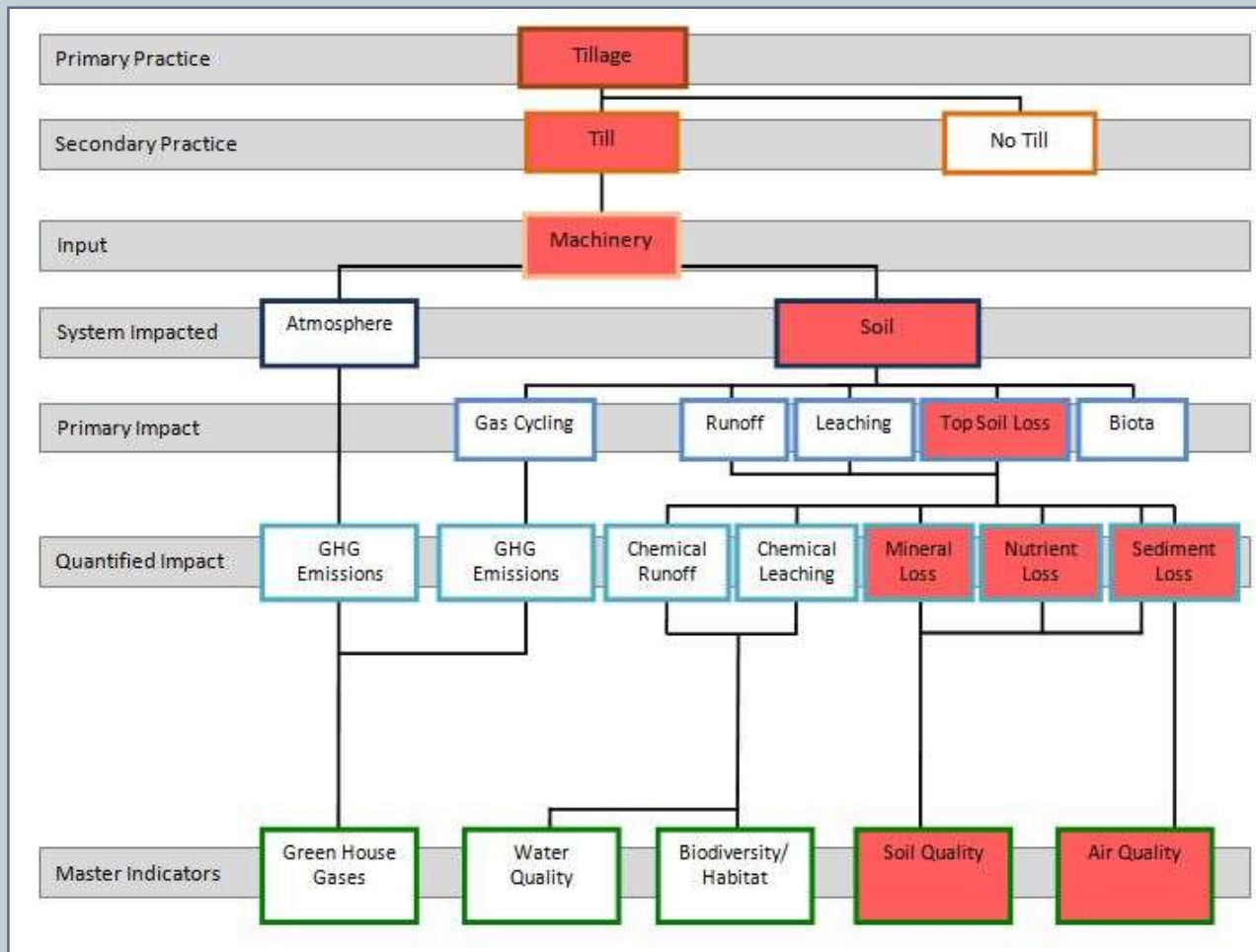
Externality Pathway



Externality Pathway



Externality Pathway



Assumptions and Limitations



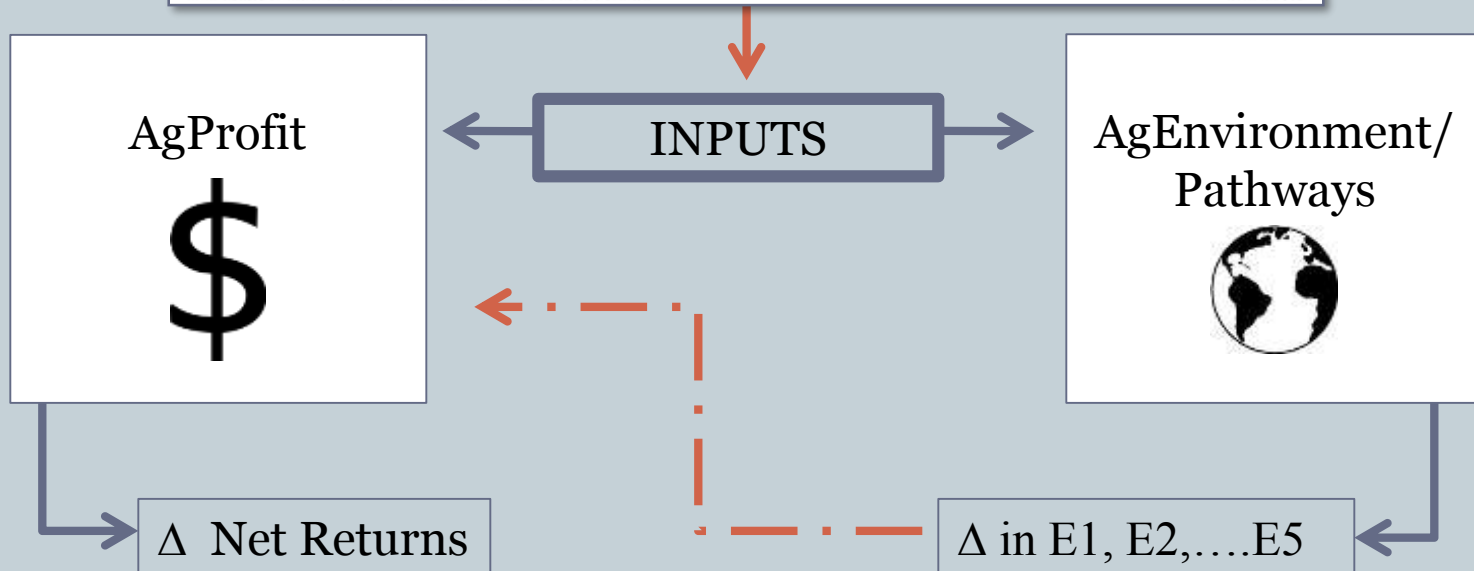
- Reliance on research and conclusions published by third party
- Assuming homogenous practices and impacts
- Limited precision
 - Scalability
 - Indicators
 - Transferability



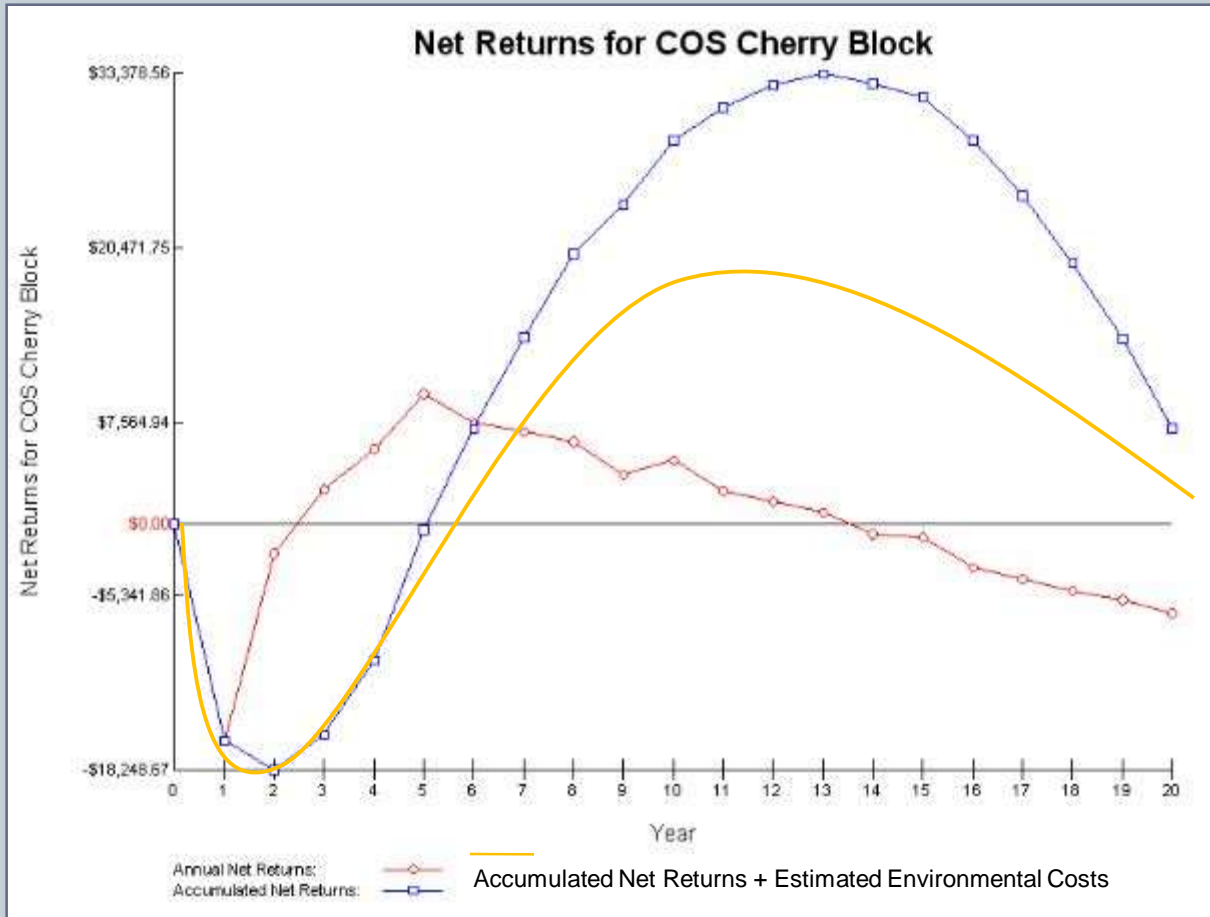
Moving Forward...



Harvesting Operations					
Combine grain		0.69	3.01	0.00	3.70
Hauling grain		2.27	8.28	0.00	10.54
Wheat commission	\$ 0.05 /bu	0.00	0.00	5.50	5.50
Other Charges					
Pickup & truck repairs, fuel & lube		0.00	17.29	0.00	17.29
Precision technologies		0.00	0.54	0.00	0.54
Other machinery		0.00	0.40	0.00	0.40
Miscellaneous		4.47	1.00	5.00	10.47
Interest: operating capital	12.00 mons	0.00	0.00	3.45	3.45
Total variable cash costs		\$9.84	\$47.94	\$154.70	\$212.48
Total gross income minus variable cash costs					\$722.52



Moving Forward...



Year	Net Returns for COS Cherry Block	Net Returns for COS Cherry + Δ in E1,...E5
1	-\$16,082.53	-\$18,250.00
2	-\$18,248.67	-\$18,248.67
5	-\$418.11	-\$1,000.00
10	\$28,435.95	\$17,000.00
15	\$31,677.20	\$15,000.00
20	\$7,101.09	\$4,000.00

Final Thoughts



- Large scale problem
- Our piece of the puzzle
- Research take away

Special thanks to Susan Capalbo, Clark Seavert, Penny Diebel, Laurie Houston, Marijka Haverhals, & Michael O'Rourke!