

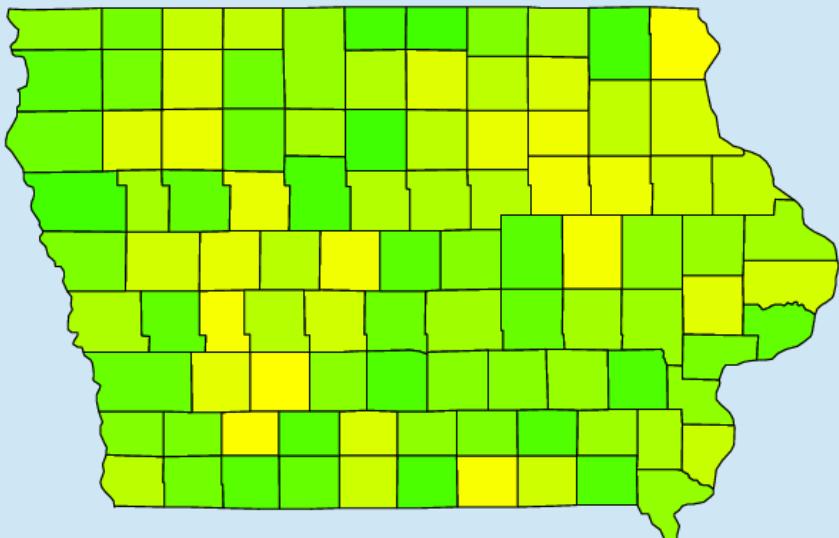
CornCalc

Tim Ivancic
for Harvesting inc.

- Harvesting inc. plans to provide crop yield predictions to insurance companies to:
 - Determine fair premiums
 - Identify fraud

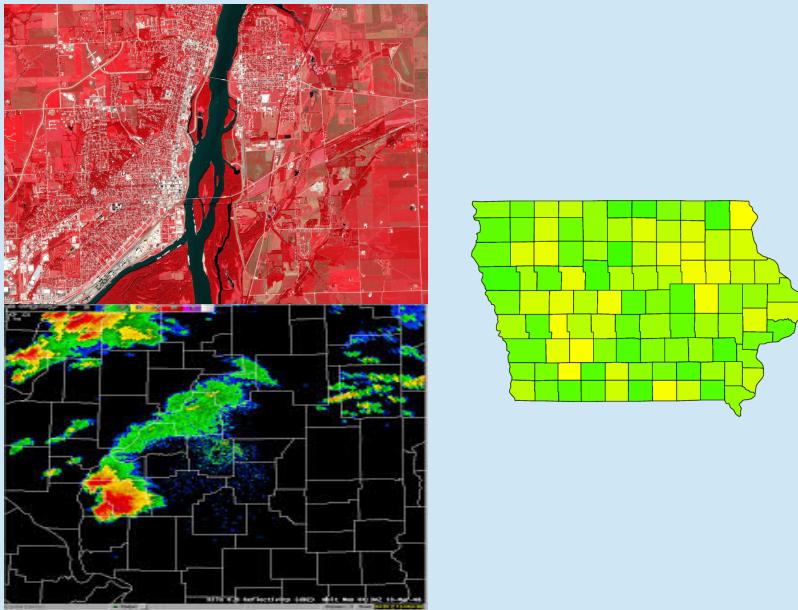


- In developing countries, there is limited information on which to base crop insurance premiums

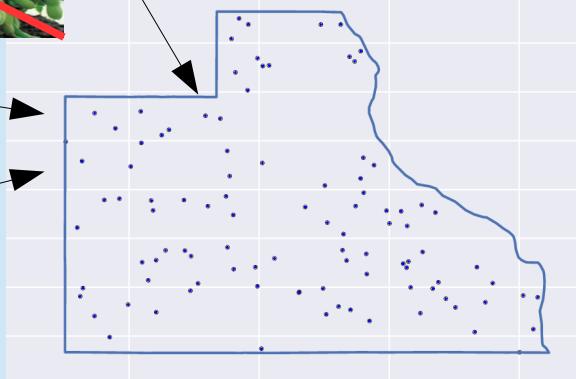
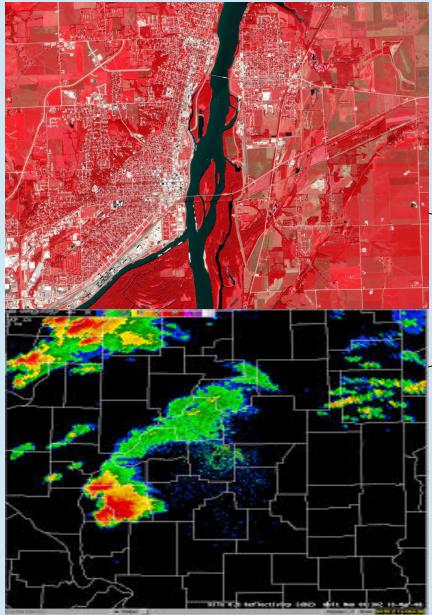


CornCalc: The Solution

- A model of corn yield based on satellite data sources



Pipeline



99 Counties

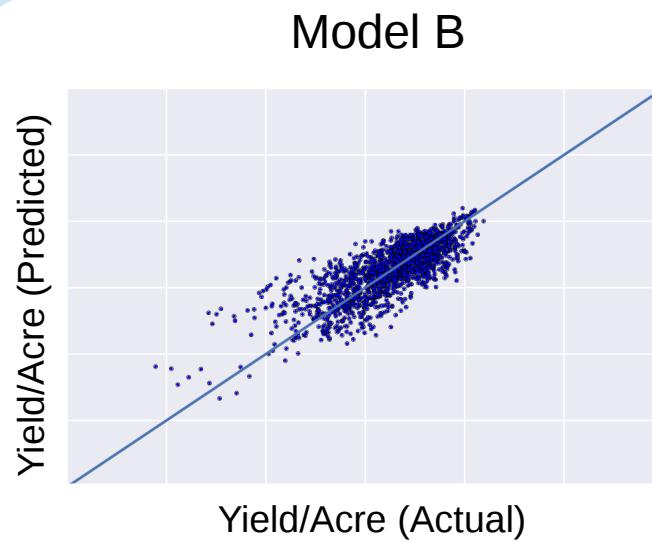
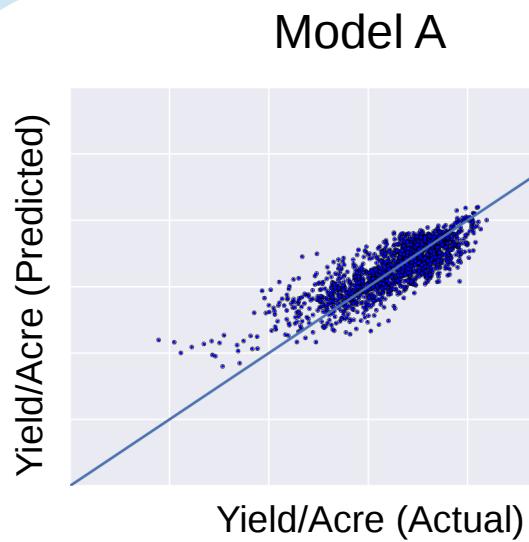
Date	4/5	...
Temp	20.0	...
Precip	0.0	...
IR reflectance	123.464	...
...

548 Features

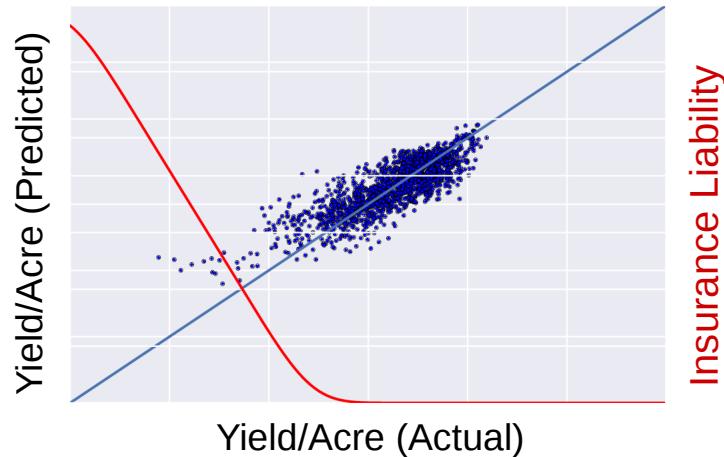
- Mean Temperatures
- Max Windspeeds at germination
- Relative Humidity
- Solar insolation
- Vegetative indices

Feature Engineering and Forward Stepwise Regression: 15 Features

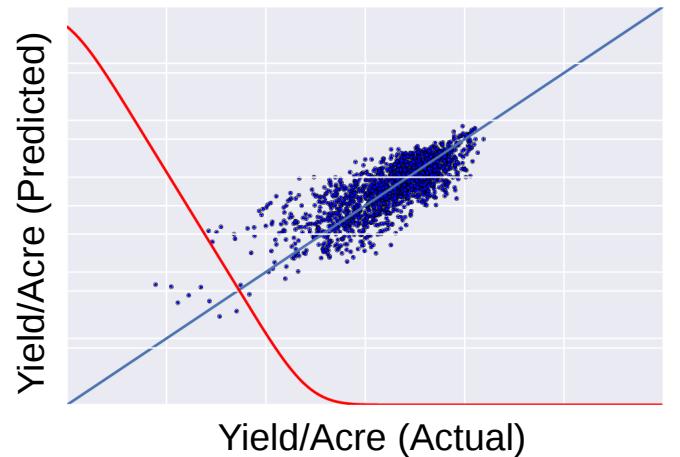
Model metrics are relative to the problem



Model metrics are relative to the problem

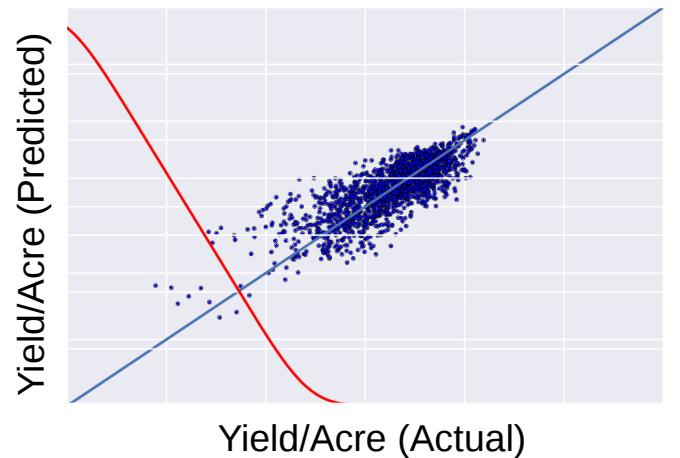
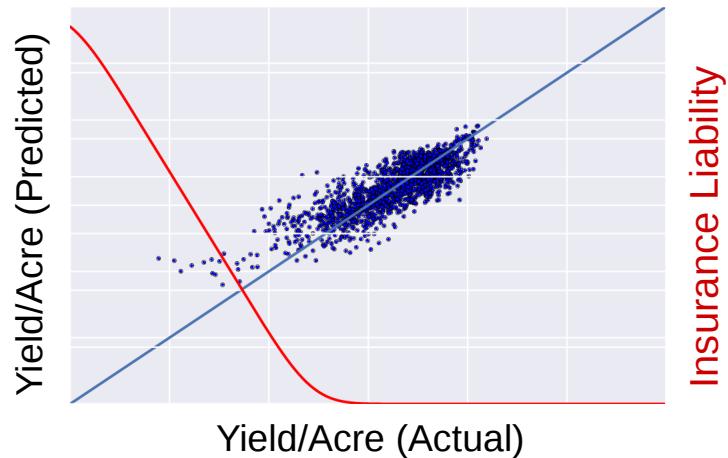


R² = .69
Liability Error = \$9.05 / Acre



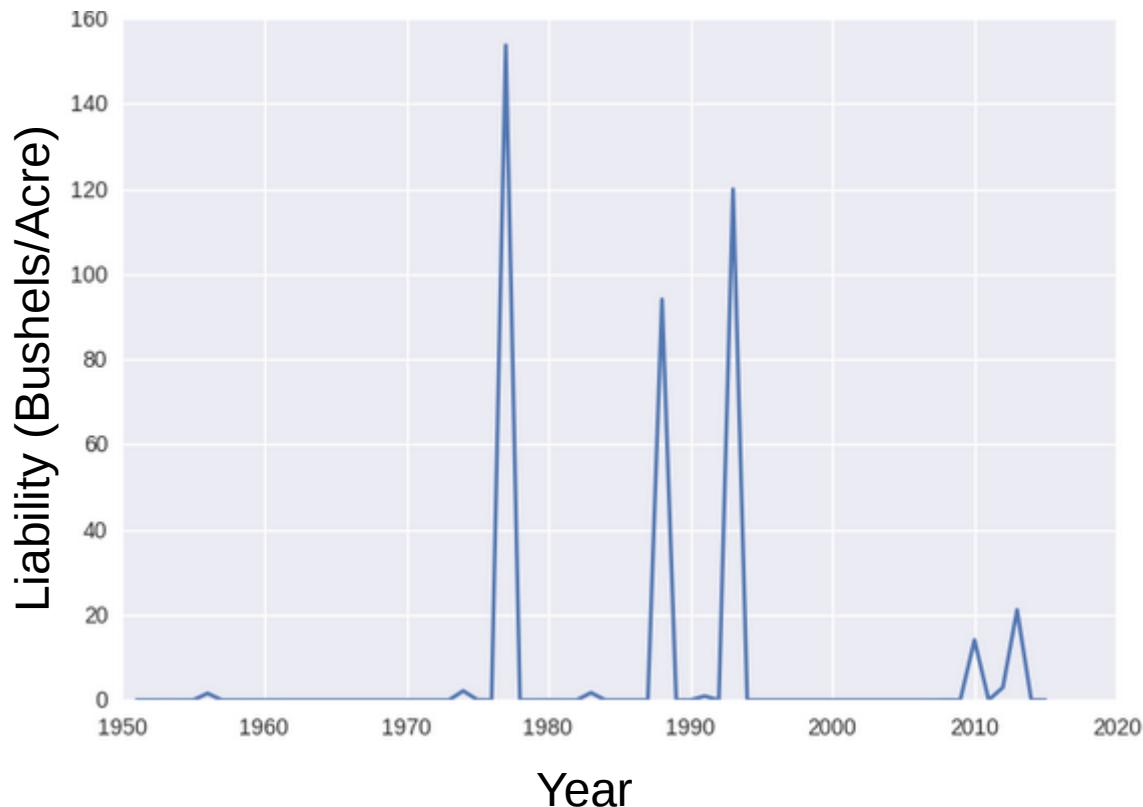
R² = .62
Liability Error = \$7.87 / Acre

Model metrics are relative to the problem



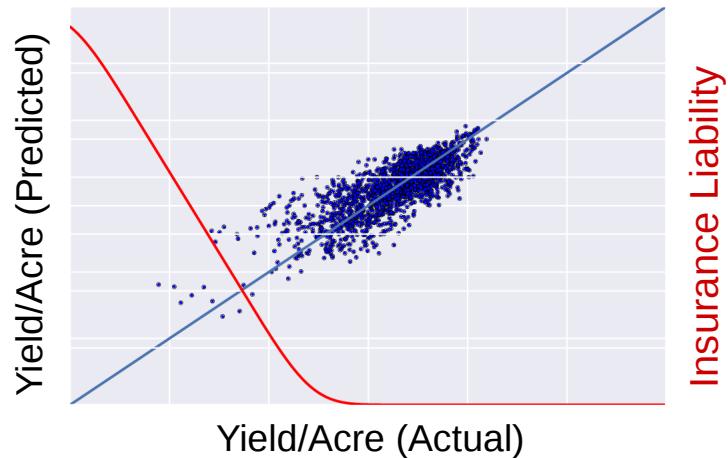
Difference of \$9.8M/yr

Early predictions



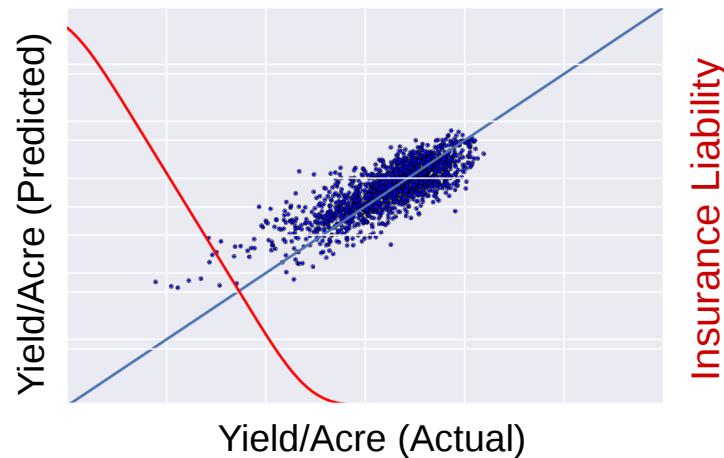
Early predictions

At Harvest



Liability Error = \$7.87 / Acre

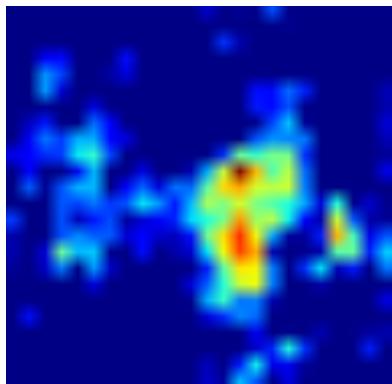
3.5 months earlier



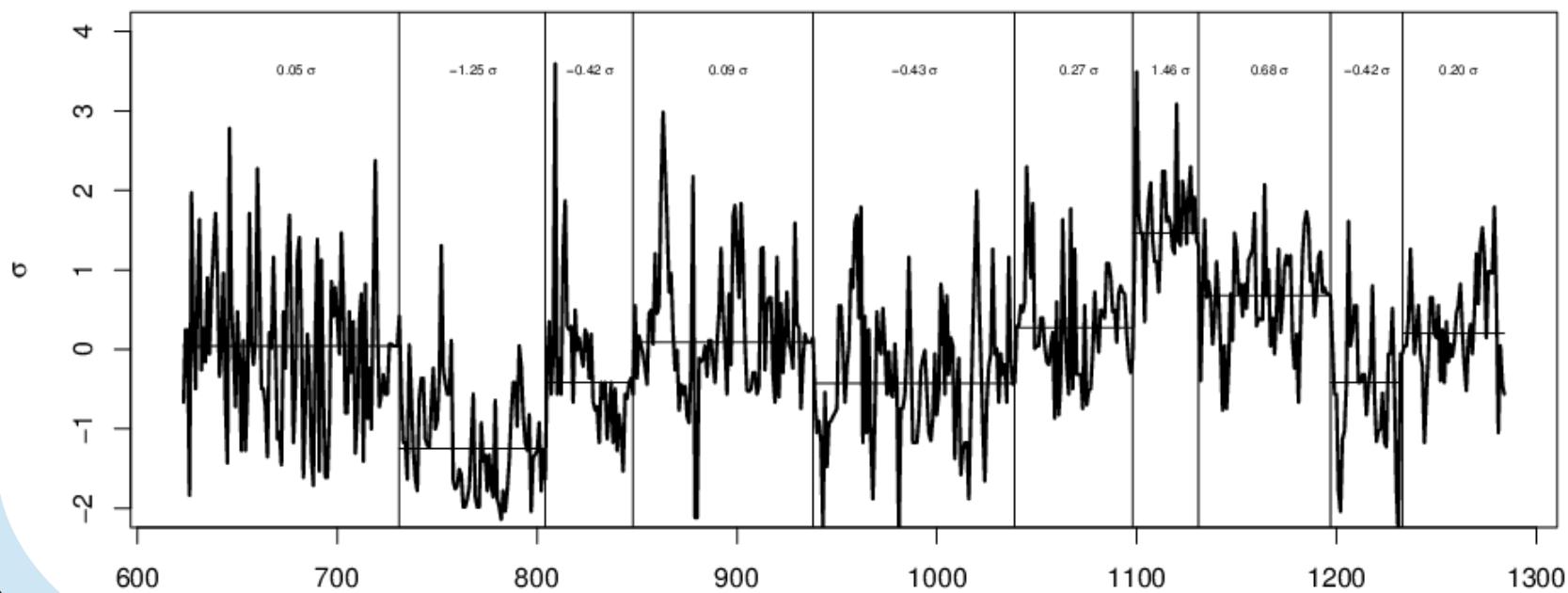
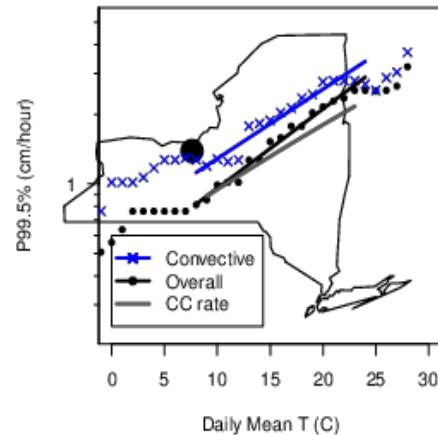
Liability Error = \$8.50 / Acre

Insurance Liability

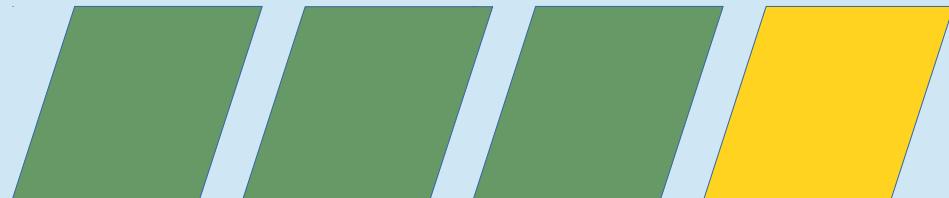
Tim Ivancic



Nile Low Flow

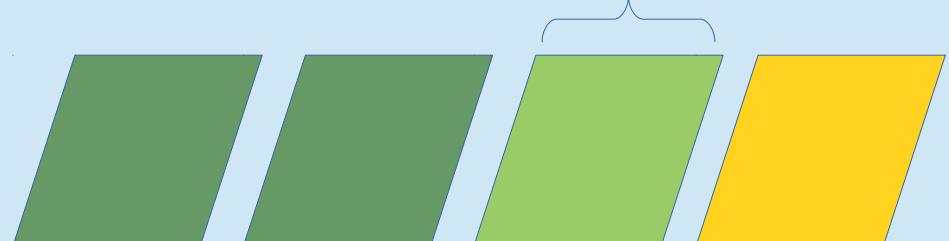


Yield Based Crop Insurance



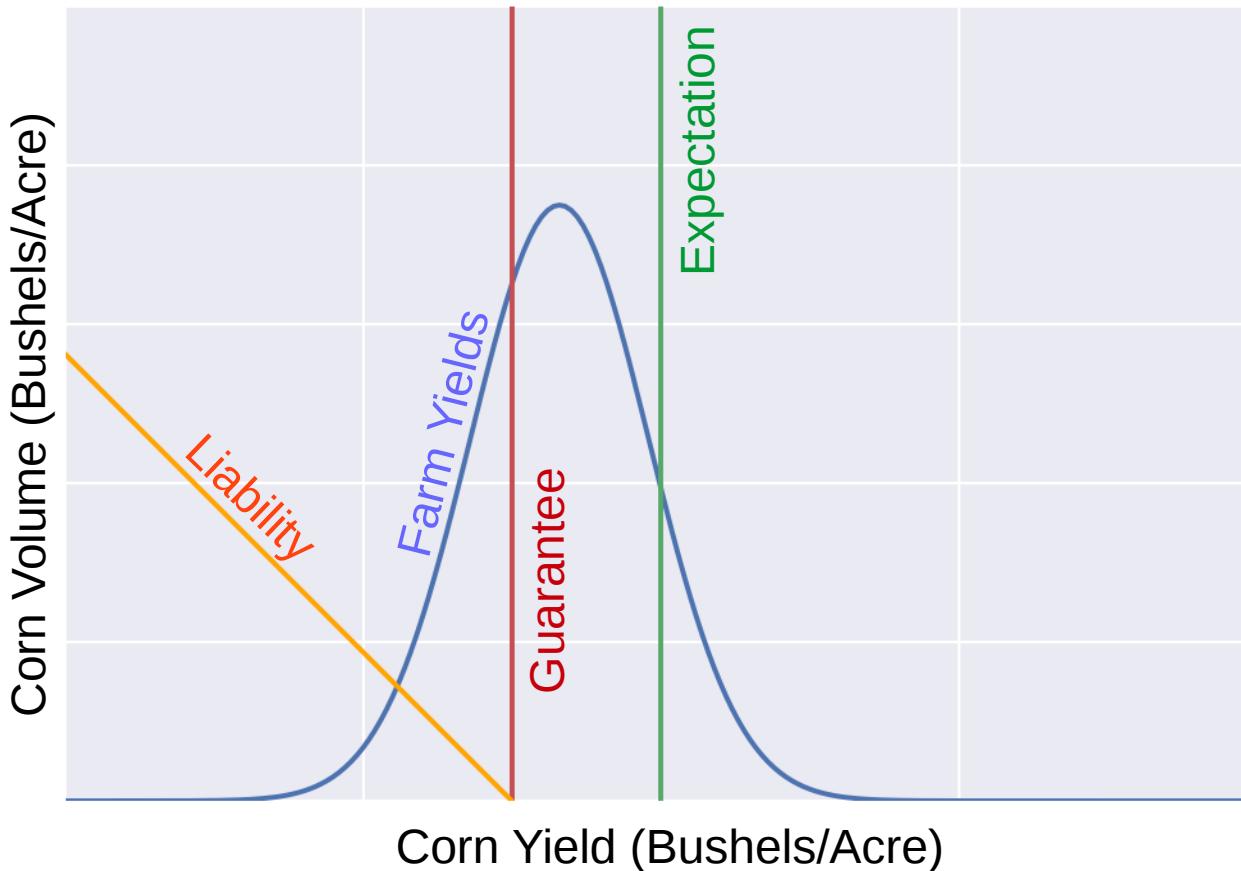
Guarantees a percent
of historic yield

Insurance pays a fraction of shortage

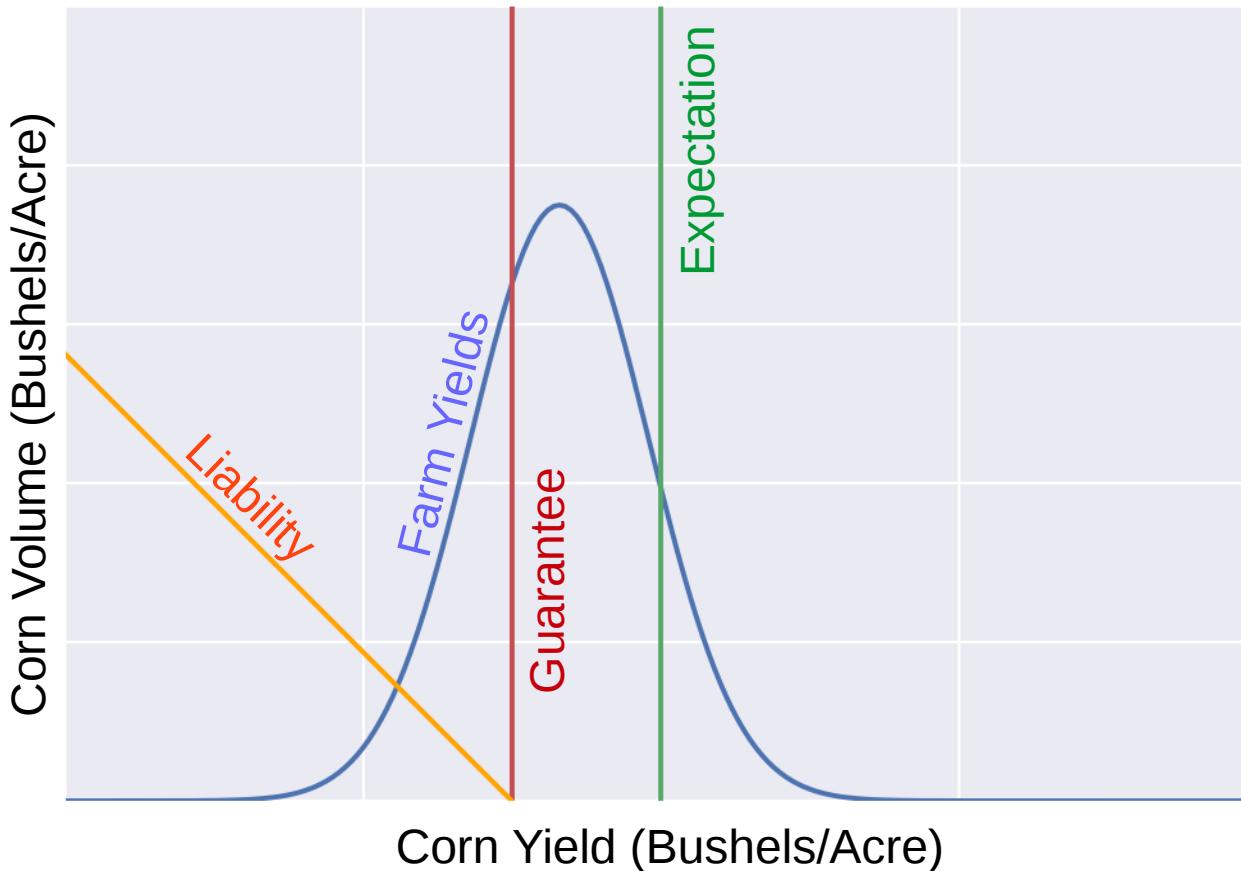


When yield is less than
guarantee, insurance is
liable for a fraction of
the shortage

Liability by county



Liability by county



Total Payout = Area Insured X Farm Yields X Liability X Corn Market Price