Producer Framework for Mitigating Price and Production Risk
Logistics

✓ This presentation and materials will be available shortly at http://go.osu.edu/FarmManagement

✓ Ohio State has several resources to assist producers with farm management related topic at https://farmoffice.osu.edu/home
Outline

- What Risk is and is not (you may be surprised to find out)
- Institutional Framework to manage your Risk
- Areas of Risk identified by Ohio producers
- Alternatives Risk Management Plans
- Marketing Plans
- Common Challenges to Grain Marketing

Taken on Brown Farms in Missouri
Photo Credit- Nancy Brown “Hi Mom!”
Outlook Presentations - The Standard

**Total U.S. Soybean Commitments**
(Outstanding Sales plus Exports)

<table>
<thead>
<tr>
<th>Metric Tons (1 ton = 36.7 bu.)</th>
<th>2015/16</th>
<th>2016/17</th>
<th>2017/18</th>
<th>2018/19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest of the World</td>
<td>0</td>
<td>10,000,000</td>
<td>20,000,000</td>
<td>30,000,000</td>
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<tr>
<td>Unknown Destinations</td>
<td>0</td>
<td>10,000,000</td>
<td>20,000,000</td>
<td>30,000,000</td>
</tr>
<tr>
<td>China</td>
<td>0</td>
<td>10,000,000</td>
<td>20,000,000</td>
<td>30,000,000</td>
</tr>
</tbody>
</table>

**12-Month Moving Total of U.S. Soybean Exports to the European Union (2015-Present)**

- Start of Chinese Tariffs on U.S. Soybeans
- At 9.4 million tons, this is almost 2 times as 2018

**Crude Oil and Gasoline Prices**

- Monthly Retail gasoline
- Annual Average Gasoline
- Monthly Brent crude oil
- Annual Average Brent

**Forecast**

- 2019:
  - Crude Oil: $2.72
  - Gasoline: $2.47
Production Risk- 2019 Yield Potential

2019 Corn Acres in Poor or Very Poor Condition- July 15
Rounded to 1,000 Acres

Roughly 11 million acres in poor or very poor condition nationwide

Author Calculation using NASS Data
Understanding - Risk vs Uncertainty

Risk involves making a decision that exposes the business to an uncertain future.

- No Decision = No Risk
- No Risk = Not possible in Agriculture

So the Question becomes: **How do I balance the trade-off of taking a risk with the possible returns?**

- Enter- Applied Agricultural Economics

  (the allocation of goods and services to maximize benefit!)

Economics is fun!!!
Understanding - Future Payout/ Reward

Farming becomes gambling when either of two conditions arrive
1. Cannot identify the probabilities of an outcome
   Example: we don’t know how often something will occur

2. Accepts something where the payout is less than the cost
   Example: If our breakeven for planting corn was 180 bu./acre
Understanding - Variability vs Uncertainty

Seasonal Patterns of Ohio Average Cash Corn Prices: 1960-2019

Data Source = Author Calculation using Cincinnati Monthly Cash Prices
Understanding - Variability vs Uncertainty

Seasonal Patterns of Ohio Average Cash Corn Prices: 2010s

The uncertainty is how different are we going to be from the seasonal pattern we know to be true.

Data Source = Author Calculation using Cincinnati Monthly Cash Prices
Understanding - Future Payout/ Reward

Planning on Planting Corn

- Getting Corn Planted
  - Trend Yield = 180 bu./acre
  - Probability = 85%

- Not Getting Corn Planted
  - Actual Production History = 150 bu./acre
  - Probability = 15%

Future Payout for Deciding to Plant Corn: 
\[(180 \times 0.90) + (150 \times 0.10) = 175.5 \text{ bu./acre}\]

The 1996 Farm Bill Created the Risk Management Agency

1. Price and Market
2. Production
3. Legal, Government and Regulatory
4. Human Resource
5. Financial
Strategic Risk Management Planning

1. Determine Financial Health
2. Risk Preference
3. Establish Risk Goals
4. Identify and Prioritize Risks
5. Probability of Risk Happening
6. Consider Options
7. Action
8. Flexibility

Based on Work by Hoag et.al.
## Top Sources of Risk - Producer Survey

<table>
<thead>
<tr>
<th>Type of Risk*</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price Uncertainty</td>
<td>1</td>
</tr>
<tr>
<td>Production Uncertainty</td>
<td>2</td>
</tr>
<tr>
<td>Government (Regulation)</td>
<td>3</td>
</tr>
<tr>
<td>Farm Transition</td>
<td>4</td>
</tr>
<tr>
<td>Government (Federal Programs)</td>
<td>5</td>
</tr>
<tr>
<td>Input Cost</td>
<td>6</td>
</tr>
<tr>
<td>Technology</td>
<td>7</td>
</tr>
</tbody>
</table>

*Survey Taken During OSU Outlook Meetings 2018, Participants=291

### Price Risk (0= None, 5=a lot) & Ranking

<table>
<thead>
<tr>
<th>Risk</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Margins</td>
<td>4.7</td>
</tr>
<tr>
<td>Market Access</td>
<td>4.5</td>
</tr>
<tr>
<td>Volatility in Prices (Dairy)</td>
<td>4.1</td>
</tr>
<tr>
<td>Increasing Input Prices</td>
<td>3.7</td>
</tr>
</tbody>
</table>

### Production Risk (0= None, 5=a lot) & Rank

<table>
<thead>
<tr>
<th>Risk</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease, insect, and weeds</td>
<td>4.5</td>
</tr>
<tr>
<td>Regulation</td>
<td>4.4</td>
</tr>
<tr>
<td>Consolidation of Input Providers</td>
<td>4.0</td>
</tr>
<tr>
<td>Weather</td>
<td>3.9</td>
</tr>
<tr>
<td>Chemical Drift</td>
<td>3.9</td>
</tr>
</tbody>
</table>
Strategic Risk Management Planning

Avoid Risk-

✓ Holding money under a mattress (no one else gets to touch it)
✓ Could open up to more risk (Mattress burns)
✓ Ag Example would be not growing a certain crop because it is more risky

Transfer Risk

✓ Insurance Contracts- Paying a company a premium for them to hold your risk.
✓ Futures Market- Transferring risk to a speculator that’s willing to buy the other half of your contract.

Assume or Retain Risk

✓ There is usually a positive connection between risk and return.
✓ Those that can last- typically make more money in the end.

Reduce Risk

✓ Everything above is probably an extreme option. What if those aren’t options
✓ Take on a new crop, but do it in a small amount so it doesn’t tank the operation.
Choosing Alternatives

1) Reducing Extremes - Hedging

2) Raise the Price - Grain Storage

3) Skewing the Probability to One end - Drainage or Irrigation

4) Cutting off the down-side: Insurance and futures options
Risk Management - Choosing Alternatives

Crop and Revenue Insurance

✓ A way to Transfer Risk

✓ Risk Protection against potentially low yields or revenue against low prices and low yields.

✓ Government subsidies make the program below the actuarially fair rate for producers.
  ✓ Moral Hazard (planting in flood prone areas) and Adverse Selection (asymmetric info.)

✓ Requirement by lender to receive short term production loans or long term investments.

✓ Helps fill forward or futures contracts in years of short return.
Risk Management - Choosing Alternatives

Forward Contracting

✓ A way to transfer Market Risk (Only) from seller to the buyer, does not transfer the Production Risk.

✓ Lock in a harvest deliver price for a crop that is still growing.

✓ Make changes in their delivery date for tax purposes

Futures and Options

✓ A way to transfer Market Risk (Only) from seller to the buyer, does not transfer the Production Risk.

✓ Does not manage local basis (talk about this later)

✓ More management than Forward Contracting
Risk Management- Choosing Alternatives

Diversification

✓ A way to **Reduce** Risk
  ✓ A very common risk management strategy, but giving up efficiencies and economies to scale of specialization.

✓ Can be in many forms
  ✓ Enterprises within an operation (soybeans, wheat, cattle, trucking, and seed sales)
    ✓ However be careful not to add an inefficient enterprise just for the sake of it....
    ✓ Also adding like enterprises is not diversification (wheat and barley)
    ✓ If possible seek low risk enterprises. Crops with government support are less risky than those without.

✓ Market Timing (Spreading out your sales – we’ll talk about this later)
  ✓ Not going to get the highest price for all sales, but hopefully for some.

✓ Physical locations (common in western Kansas, somewhat in Ohio)

✓ Business Structure (c corp., s corp., LLC)

✓ Off Farm Employment- Becoming more common with high health care, but also provides a diversified income stream.
Risk Management - Choosing Alternatives

Low-risk Production Practices

✓ A way to Reduce Risk

✓ Types
  ✓ Irrigation/ drainage
  ✓ Tillage - conservation tillage
  ✓ Having Excess Equipment on hand in case of breakdown

Bottom Line is there is benefit to having a long list of alternatives

✓ Make a list - then ask a friend/neighbor/ Extension Educator for other ideas.

✓ Most risk reducing practices will lower the top end, but should increase your expected return/ payout.
Recognizing **Price Risk**

**Price** = Function of (Supply, Demand) Modified by the Flow of Money

No, not Greed and Fear

**Price Reaction to Stocks Over Last 20 Years**

Data Source = PSD Database
Marketing: **Fundamental vs Technical**

“So Ben, this was all great and dandy, but what does it mean for my operation?”

The Greed-Hope-Fear School of Marketing
Common Challenges in Grain Marketing

1. Reluctance toward Pre Harvest Marketing Plans
2. Understanding Local Basis
3. Having an Exit Strategy
4. Understanding Market Carry

I learned grain marketing from Ed Usset and Frayne Olson
Grain Marketing - Common Challenges

Concern about Pre-Harvest Marketing

1. Seasonal price patterns - Usual decreases from Planting to Harvest
2. Opportunities to get above cost of Production

Seasonal Patterns of Ohio Average Cash Soybean Prices: 1960-2019

Adapted from Grain Marketing is Simple - Ed Usset
Timing: Corn Seasonality

Corn December Futures Prices: 2000-2019

<table>
<thead>
<tr>
<th>Year</th>
<th>May 15</th>
<th>Oct 15</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$3.77</td>
<td>$3.54</td>
<td>$0.23</td>
</tr>
<tr>
<td>2008</td>
<td>$5.90</td>
<td>$3.73</td>
<td>$2.17</td>
</tr>
<tr>
<td>2009</td>
<td>$4.16</td>
<td>$3.68</td>
<td>$0.48</td>
</tr>
<tr>
<td>2010</td>
<td>$3.56</td>
<td>$5.38</td>
<td>$(1.82)</td>
</tr>
<tr>
<td>2011</td>
<td>$6.88</td>
<td>$6.44</td>
<td>$0.44</td>
</tr>
<tr>
<td>2012</td>
<td>$6.37</td>
<td>$7.57</td>
<td>$(1.20)</td>
</tr>
<tr>
<td>2013</td>
<td>$5.27</td>
<td>$4.51</td>
<td>$0.76</td>
</tr>
<tr>
<td>2014</td>
<td>$4.86</td>
<td>$3.43</td>
<td>$1.43</td>
</tr>
<tr>
<td>2015</td>
<td>$3.69</td>
<td>$3.85</td>
<td>$(0.16)</td>
</tr>
<tr>
<td>2016</td>
<td>$3.95</td>
<td>$3.45</td>
<td>$0.50</td>
</tr>
<tr>
<td>2017</td>
<td>$3.66</td>
<td>$3.31</td>
<td>$0.35</td>
</tr>
<tr>
<td>2018</td>
<td>$3.95</td>
<td>$3.58</td>
<td>$0.37</td>
</tr>
</tbody>
</table>

- Since 2000, 14 out of 19 years have had a higher futures price on May 15 than Oct. 15. That’s 74%!!
- The average decrease was $0.73.
- 5 out of 19 years had a higher futures price on Oct. 15 than May 15 or 26% of the time.
- The average increase was $0.83.
- If done every year you would have netted, a positive $0.32/bu.

Data: Barchart Nearby Futures
**Timing: Soybean Seasonality**

- Since 2000, 13 out of 19 years have had a higher futures price on May 15 than Oct. 15. That’s 68%!!

- The average decrease was $1.91*.

- 6 out of 19 years had a higher futures price on Oct. 15 than May 15 or 32% of the time.

- The average increase was $1.09*.

- If done every year you would have netted, a positive $0.96/bu.

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**Soybean November Futures Prices: 2000-2019**

<table>
<thead>
<tr>
<th>Year</th>
<th>May 15</th>
<th>Oct 15</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$7.36</td>
<td>$9.36</td>
<td>-$2.00</td>
</tr>
<tr>
<td>2008</td>
<td>$13.08</td>
<td>$8.05</td>
<td>$5.03</td>
</tr>
<tr>
<td>2009</td>
<td>$11.29</td>
<td>$9.73</td>
<td>$1.56</td>
</tr>
<tr>
<td>2010</td>
<td>$9.25</td>
<td>$11.52</td>
<td>-$2.27</td>
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<tr>
<td>2011</td>
<td>$13.90</td>
<td>$12.42</td>
<td>$1.48</td>
</tr>
<tr>
<td>2012</td>
<td>$13.96</td>
<td>$14.79</td>
<td>-$0.83</td>
</tr>
<tr>
<td>2013</td>
<td>$15.70</td>
<td>$12.63</td>
<td>$3.07</td>
</tr>
<tr>
<td>2014</td>
<td>$14.82</td>
<td>$9.31</td>
<td>$5.51</td>
</tr>
<tr>
<td>2015</td>
<td>$9.48</td>
<td>$8.86</td>
<td>$0.62</td>
</tr>
<tr>
<td>2016</td>
<td>$10.32</td>
<td>$9.30</td>
<td>$1.02</td>
</tr>
<tr>
<td>2017</td>
<td>$9.28</td>
<td>$9.48</td>
<td>-$0.20</td>
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<tr>
<td>2018</td>
<td>$9.82</td>
<td>$8.24</td>
<td>$1.58</td>
</tr>
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*Large STDV on average decrease

Data: Barchart Nearby Futures
Timing: **Corn Seasonality**

- If we assume a $0.20 corn basis in May-2010 and 2015 were the only years that the May 15-Dec. Contract didn’t cover cost of production.

- Does it make sense to sell new crop corn $0.52 below cost of production?

### Corn December Futures Prices: 2000-2019

<table>
<thead>
<tr>
<th>Year</th>
<th>May 15</th>
<th>Oct 15</th>
<th>Change</th>
<th>2 yr. Cost of Prod.</th>
<th>May Futures - Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$3.77</td>
<td>$3.54</td>
<td>$0.23</td>
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<td>$5.65</td>
<td>$0.72</td>
</tr>
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<td>2013</td>
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<td>$4.51</td>
<td>$0.76</td>
<td>$4.24</td>
<td>$1.03</td>
</tr>
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<td>$4.86</td>
<td>$3.43</td>
<td>$1.43</td>
<td>$3.97</td>
<td>$0.89</td>
</tr>
<tr>
<td>2015</td>
<td>$3.69</td>
<td>$3.85</td>
<td>$(0.16)</td>
<td>$4.01</td>
<td>-$0.32</td>
</tr>
<tr>
<td>2016</td>
<td>$3.95</td>
<td>$3.45</td>
<td>$0.50</td>
<td>$3.56</td>
<td>$0.39</td>
</tr>
<tr>
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<td>$3.66</td>
<td>$3.31</td>
<td>$0.35</td>
<td>$3.45</td>
<td>$0.21</td>
</tr>
<tr>
<td>2018</td>
<td>$3.95</td>
<td>$3.58</td>
<td>$0.37</td>
<td>$3.50</td>
<td>$0.45</td>
</tr>
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</table>

Data: Barchart Nearby Futures & OSU Farm Budgets - Barry Ward
Pre-Harvest Marketing Concern - **Key Takeaways**

- Pick a couple of early season dates and monitor their seasonality's.
  - I use February 15, March 15 and May 15

- When early season marketing is below costs - judgement call
  - Sometimes this isn’t about ensuring profit, but minimizing loss
  - This is only half the equation - as there might be chances to store and wait for higher prices after harvest.

- Pick a Benchmark - where price is to “low” to sell for you
  - Be reasonable in your benchmark,
  - I use cost of production with some management cost. Usually 4% of total production
    - I’m not willing to go below $0.10 cost of production

I learned grain marketing from Ed Usset and Frayne Olson
Grain Marketing - Common Challenges

Failure to Understand Local Basis

• Local Basis = Cash Price – Futures Price
  1. Quality Basis (Protein in Wheat)
  2. Spatial Basis (Mostly Transportation Cost)
  3. Temporal Basis (Mostly Storage Cost)

However this only holds when the contract is about to expire a better way to express this is:

• Local Basis= Local Supply- Local Demand (or the Flow of Grain)

Basis can be highly volatile in years with inverted futures markets (the nearby is selling at a premium to a deferred contact)

Questions:
  1. Do you know your local basis pattern?
  2. When is it the strongest?

Adapted from Grain Marketing is Simple- Ed Usset
Nearby Soybean Basis in North Central Ohio

- Nov Futures
- Jan Futures
- Mar Futures
- May Futures
- Jul Futures
- Aug Fut.
- Sep Fut.

$/Bushel

Sept Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug

- $0.90
- $0.70
- $0.50
- $0.30
- $0.10

Price Risk - Basis

15/16- 17/18 Avg. 2018/19

Data Source: DTN
Grain Marketing - Understanding Basis

Several Options to Use in Grain Marketing-
1. Forward Contract
2. Futures Contract (Those that have a solid margin account)
3. Hybrid – Hedge to Arrive

Which one to use? First question is how well do you know your local basis

Let’s look at two examples:
1. Planting Time and New Crop Soybeans is $9.60/bu. Local elevator is bidding $8.80 and I think my local basis is usually -$0.35 to -$0.55.
   1. What should you do?

2. Corn futures are $4.30 with a positive basis of $0.40 at the ethanol plant
   1. In this case a forward contract might be a great option to take advantage of the strong basis.
Price Risk - Basis

Local Basis = Futures Price – Cash Price

Nearby Corn Basis for West Central Ohio Crop Reporting District

Data Source: DTN
Understanding Basis - Key Takeaways

✓ Follow your local basis and potentially a few other around.
  ✓ Know what end factors drive your end product.
  ✓ Have an idea of what “normal” looks like for local basis.

✓ Basis is traditionally weakest at harvest, strongest in early summer and weakens again heading into harvest.

✓ Until you understand basis - it is hard to utilize the best marketing strategies.

✓ Basis can be very irregular in years with tight supply or the futures market is inverted.

I learned grain marketing from Ed Usset and Frayne Olson
Grain Marketing - Common Challenges

Not Having an Exit Strategy

Consider the following Strategies

1. Hold the grain in storage
2. Hold the grain in storage and buy put options to establish a price floor
3. Sell your grain and buy a call option

But what is your Exit Strategy????

- Watching price go up 50 cents then fall 30 cents and say “I’ll sell when the market goes back up” This is how we get 3 year old stored grain.

2003 Soybeans are a great example: price reached $10.50 in May of 2004. Price didn’t get back to 10.50 until 2007.
Not having an Exit Strategy - Key Takeaways

“Everyone needs an exit strategy because if you don’t know where you are going, then how do you know you got there?” - Ed Usset

Exit Strategies

1. **Price-Driven**: have bounds for what you will sell your grain for, or when you will exit and cut your loss. *Be realistic!*

2. **Time Driven**: committing to sell at a certain point or over intervals. If I know that price is highest during spring. Shouldn’t I be looking during that price window?
   1. I tend to use trailing stops- a strategy that says I will sell if price drops $0.10 after a recent high.
   2. I’ve also bought put options along the way and when the price crosses the put- I sell.

I learned grain marketing from Ed Usset and Frayne Olson
Grain Marketing - Common Challenges

Not Understanding Carrying Charges

Storage is a great tool to speed up harvest efficiency and to avoid harvest price lows and large dump fees at the elevator.

1. However, it can also be used to roll grain marketing problems into the next year….. Or the year after that ….. or the year after that.

The reverse of this is become known as paper farming.

1. Selling grain at harvest and buying a call option.
2. Buying a call means you are looking for the market to go up (bullish)

![Diagram showing gains and losses with strike price and call option values.]

- Strike Price = $4.30
- Call Option = $0.33
- Breakeven Price = $4.63

CFAES
Grain Marketing - Calculating Carry

“Carrying Charges in futures give us a guide to storage decisions and a glimpse of the bullish or bearish tone of the market”

CBOT Corn Futures July 17, 2019

Dec. 19 $4.39
Mar. 20 $4.46
May 20 $4.50
Jul. 20 $4.52
Sep 20 $4.24

Full Carry per Month = (price x interest rate)/12 + (Monthly Storage Rate)

Full Carry per Month = ($4.39 x 5.5%/12 + (6 cents)

8 cents = 2 cents interest + 6 cents storage

8 cents x 7 months (December – July) = Full Carry of 56 cents

Current carry is ($0.56 / (4.52-4.39)= 23% Full
Not Understanding Carry Charges- Key Takeaways

Carry charges are market oriented storage costs.

Carry Charges tell us about storage decisions and the bullish or bearish nature of the crop.

- Short crop / tight stocks will have a “small” or inverted carry.
- Large plentiful stocks will have a “large” carry- telling the producer to store

If carrying charges are flat or inverted (like they could be in 2019) it makes sense to me to sell grain at harvest and avoid the actual storage costs including interest expense, physical loss, and added risk.

If there is substantial carry, the only thing you are doing by selling at harvest at a low price and buying a pricy March or May contract. (YOU JUST PAID THE STORAGE COST)

I learned grain marketing from Ed Usset and Frayne Olson
At the End of the Day......

What is going to cause you to lose the most sleep and therefore add stress:

1. Selling and the market goes up?

2. Not selling at the market goes down?

Keep things simple (not complicated) because the complicated path adds more decisions.
In Conclusion- **Ben’s Takeaways**

- Figure out your risk preference. Then, do some economics!!!
  - I promise you that the payoff/returns formula works, and will make you a better decision maker!

- Manage your farm on a site specific nature using biological and economic information instead of decision of the whole farm.
  - Field efficiency is key. Do not base decisions on the whole farm.

- Consider a list of alternatives- figure out what the trade off is.
  - There are very few things that are risk reducing and higher reward just FYI

- Have a marketing strategy
  - Make it realistic
  - Don’t be afraid to ask for help if need be
Save the Date:
2019 Agricultural Policy and Outlook Conference

November 12, 2019 – 8:30am - 2:30pm
Nationwide & Ohio Farm Bureau 4-H Center

Register at go.osu.edu/OHAgOutlook2019

DMC- Happening Now
ARC and PLC- Coming in September
https://aede.osu.edu/research/osu-farm-management
This spring and summer has been tough, but if you need someone to talk to- *always* feel free to call me on my cell below! We are here for you!

Ben Brown  
College of Food, Agriculture, and Environmental Sciences  
Department of Agriculture, Environmental, and Development Economics  
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