February 2, 2024
KY TN Grain Day
Dr. S. Aaron Smith, Associate Professor and Extension Economist
Department of Agricultural and Resource Economics
University of Tennessee Institute of Agriculture
Email: aaron.smith@utk.edu
Web Page: https://cropeconomics.tennessee.edu
Overview

- General Economy
- Input Prices
- Corn and Soybean Supply and Demand
- Old and New Crop Pricing
- Risk Management & Marketing Strategies

2023 Vegetation Drought Response Index (VegDRI)

Source: https://vegdri.unl.edu/
GENERAL ECONOMY

Slow down in 2024?
Prime Rate and Inflation Rate, Jun 2020 to Dec 2023

Data Sources:
Unemployment and Labor Force Participation Rate, 2020 to 2023

Data Sources:
https://fred.stlouisfed.org/series/CIVPART
https://www.bls.gov/cps/
United States Quarterly GDP Growth Rate, 2021 to 2023

Data Source: https://tradingeconomics.com/united-states/gdp-growth
Personal Consumption Expenditures, Monthly Seasonally Adjusted, 1980 to 2023

\[ y = 0.9611x - 27883 \]
\[ R^2 = 0.9648 \]

\[ y = 4.1828x - 169785 \]
\[ R^2 = 0.9453 \]

Data Source: https://fred.stlouisfed.org/series/PCE

Real. Life. Solutions.
U.S. Receipts, Outlays, and Surplus or Deficits, 1901 to 2028 (projected)

Trillions

Data Source: https://www.whitehouse.gov/omb/budget/historical-tables/
Total Debt Balance

Source: FRBNY Consumer Credit Panel/Equifax

Data Source: https://www.newyorkfed.org/microeconomics/hhdc
General Economy Summary

- Interest rates have likely peaked (unless inflation flairs up).
  - Small declines (0.75-1%) forecast for 2024.
- Inflation has subsided but remains above the fed target of 2%.
- Labor markets remain tight.
- US GDP growth peaked in the 3rd quarter, expected to soften in 2024.
- Government spending - projected trillion plus deficits out to 2028.
- Consumer spending and debt have been on unsustainable paths.
Fertilizer, Fuel, Land

INPUT PRICES
Gasoline and Diesel Prices, January 2018 to January 2024

Weekly Midwest Regular Conventional Retail Gasoline Prices (Dollars per Gallon)

Weekly Midwest No 2 Diesel Retail Prices (Dollars per Gallon)

Data Source: https://www.eia.gov/petroleum/gasdiesel/
Producer Price Index by Commodity: Machinery and Equipment: Agricultural Machinery and Equipment

Data Source: https://fred.stlouisfed.org/series/WPU111

29% increase between 1/1/2021 and 1/1/2023
CORN SUPPLY AND DEMAND
U.S. Corn Production, Consumption, Exports, and Ending Stocks, 2014/15 to 2023/24

Data Source: USDA PSD - https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery
World Corn Production, Consumption, and Ending Stocks, 2014/15 to 2023/24

Data Source: USDA PSD - https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery
U.S. Corn Stocks-to-Use and Price Relationship, 2006-2023

\[ y = 0.8248x - 0.767 \]

\[ R^2 = 0.6033 \]

Data Source: USDA PSD - https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery
Corn Supply and Demand Summary

• Higher US yields than initially anticipated.
• US carryover stocks over 2.1 billion bushels.
• World stocks projected at highest level since 2017/18.
• Second crop corn production in Brazil will be a key determinant in 2024 price direction.
• 2024 economy and geo-politics are likely to continue to influence corn prices in 2024.
SOYBEAN SUPPLY AND DEMAND
World Soybean Production, Consumption, and Ending Stocks, 2014/15 to 2023/24

Data Source: USDA PSD - https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery
World Soybean Production, 2019/20 to 2023/24

Data Source: USDA PSD - https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery
U.S. Soybean Production, Consumption, Exports, and Ending Stocks, 2014/15 to 2023/24

Data Source: USDA PSD - https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery
Nearby Soybean, Meal, and Oil Futures Value

Price ($/bu)

Data Source: https://www.barchart.com/futures/quotes/ZS0/futures-prices?viewName=main
US Soybean Crush, 2000/01 to 2023/24

- Past Ten Years
  - US crush up – 22.8%
  - World crush up – 24.2%

Crush, 2014-2023
Soybean Days on Hand, 2014/15 to 2023/24

Data Source: USDA PSD - https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery
Brazil may have record production (again), Argentina is expected to nearly double production compared to last year’s drought reduced soybean crop.

- Erosion of US soybean export share
- Expansion of US soybean crush capacity
- Tight US stocks; large foreign stocks
- Lower anticipated prices for 2024.
Historical, Old, and New Crop

PRICES
December Corn Futures Contract, Jan 1 to Expiration, 2010-2024*

Price $/bu

Range (max-min)

Average

Min

Max


$2.46 $2.33 $1.82 $1.92 $0.94 $1.33 $0.79 $0.83 $1.14 $1.06 $2.06 $2.18 $1.79 $0.24 $6.56 $5.28 $5.26 $4.86

Real. Life. Solutions.
December Corn Closing Futures Price Frequency, 12/1/09 to 1/26/24

- Frequency
- Cumulative Frequency

Price Range (Cents):
- $0.325 - 3.50
- $3.75 - 4.00
- $4.00 - 4.25
- $4.25 - 4.50
- $4.50 - 4.75
- $4.75 - 5.00
- $5.00 - 5.25
- $5.25 - 5.50
- $5.50 - 5.75
- $5.75 - 6.00
- $6.00 - 6.25
- $6.25 - 6.50
- $6.50 - 6.75
- $6.75 - 7.00
- $7.00 - 7.25
- $7.25 - 7.50
- $7.50 - 7.75
- $7.75 - 8.00
- $8.00 - 8.25
- $8.25 - $10.00

Frequency:
- 48.4%
- 80.2%

Cumulative Frequency:
- 100%
West Tennessee Monthly Average Corn Basis at Elevators and Barge Points, 2013-2024*
December 2024 Corn Futures

Prices have broken out of the trading range and are looking to establish a new range.
November Soybean Futures Contract, Jan 1 to Expiration, 2010-2024*

<table>
<thead>
<tr>
<th>Year</th>
<th>Range (max-min)</th>
<th>Average</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>$4.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>$3.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>$5.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>$2.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>$3.61</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>$1.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>$2.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>$1.32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>$2.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>$1.37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>$3.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>$3.48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>$2.99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td>$2.78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td></td>
<td>$0.36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: United Soybean Futures*
November Soybean Closing Futures Price Frequency, 11/1/09 to 1/26/24

- % of Daily Closes
- Price Range (cents/bu)
- Frequency
- Cumulative Frequency

- Accumulated Probability
- November Soybean Closing Futures Price Frequency, 11/1/09 to 1/26/24
- Frequency
- Cumulative Frequency

- Real. Life. Solutions.
West Tennessee Monthly Average Soybean Basis at Elevators and Barge Points, 2013-2024
South American production will continue to strongly influence price direction. A $12.40 price gap will provide resistance.
Supply and Demand Summary

• General economy
  – Labor markets remain tight / GDP growth exceeded expectations last quarter
  – Increased consumer debt, inflation, and high interest rates create cautionary notes

• Inputs and commodity prices are down
  – Margins will be tighter in 2024.

• Prices are forecast to continue to move lower.

• Develop and execute a risk management and marketing plan.
Timing is everything.

RISK MANAGEMENT
How much risk are you willing to take?
2024 Crop Marketing Cycle

- **January, February, and March**: Crop Insurance and ARC/PLC selection
- **April, May, June, July, August**: Futures, contracts, options
- **September, October, and November**: Harvest sales and storage decisions
- **December though July 2025**: Storage sales/contract
- **November and December 2023**: Bridge Price Risk Gap to Crop Insurance

2024 Crop Marketing Cycle

Real. Life. Solutions.
Example: Bridging the price risk gap until crop insurance prices are determined – put option

- On November 14, a $5.20 December 2024 Corn Put Option cost $0.44, setting a $4.76 futures floor.
  - If December 2024 corn <$4.76, in the money
    - January 29 $5.20 put option was at $0.65.

- After crop insurance prices are determined:
  - Out-of-the money: exit options position recoup premium.
  - In-the-money: maintain the position as price protection.
### Corn MYA and Crop Insurance Prices, 2011-2023

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MYA</td>
<td>$6.22</td>
<td>$6.89</td>
<td>$4.46</td>
<td>$3.70</td>
<td>$3.61</td>
<td>$3.36</td>
<td>$3.61</td>
<td>$3.56</td>
<td>$4.53</td>
<td>$6.00</td>
<td>$6.54</td>
<td>$4.80</td>
<td></td>
</tr>
<tr>
<td>Projected</td>
<td>$6.01</td>
<td>$5.68</td>
<td>$5.65</td>
<td>$4.62</td>
<td>$4.15</td>
<td>$3.86</td>
<td>$3.96</td>
<td>$3.96</td>
<td>$4.00</td>
<td>$3.88</td>
<td>$4.58</td>
<td>$5.90</td>
<td>$5.91</td>
</tr>
</tbody>
</table>

January 30, December corn at $4.74; November Soybeans at $11.81.

### Soybean MYA and Crop Insurance Prices, 2011-2023

|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|
Farm Bill

- Extended to September 30, 2024.
- Budget, narrow majorities in both chambers, and an election cycle will make negotiations challenging and likely necessitate another extension.
- Price Loss Coverage (PLC) effective reference prices
  - Corn: +31 cents @ $4.01
  - Soybeans: +86 cents @ $9.26
  - Seed cotton ($0.367) and wheat ($5.50) unchanged
## Determine Cost of Production

### 2024 Soybean Budget

<table>
<thead>
<tr>
<th>Unit</th>
<th>Quantity</th>
<th>Gross Revenue ($/Acre)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soybeans</td>
<td>Bu/acre</td>
<td>$12.20</td>
<td>$610.00</td>
</tr>
<tr>
<td><strong>Variable Expenses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed</td>
<td>Thous.</td>
<td>$0.45</td>
<td>$63.00</td>
</tr>
<tr>
<td>Fertilizer &amp; Lime</td>
<td>Acre</td>
<td>$60.00</td>
<td>$60.00</td>
</tr>
<tr>
<td>Chemical</td>
<td>Acre</td>
<td>$86.73</td>
<td>$80.00</td>
</tr>
<tr>
<td>Crop Scout or Consultant</td>
<td>Acre</td>
<td>$10.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>Repair &amp; Maintenance</td>
<td>Acre</td>
<td>$33.13</td>
<td>$35.00</td>
</tr>
<tr>
<td>Fuel, Oil &amp; Filter</td>
<td>Acre</td>
<td>$17.37</td>
<td>$18.00</td>
</tr>
<tr>
<td>Operator Labor</td>
<td>Acre</td>
<td>$8.90</td>
<td>$9.00</td>
</tr>
<tr>
<td>Crop Insurance</td>
<td>Acre</td>
<td>$15.00</td>
<td>$15.00</td>
</tr>
<tr>
<td>Operating Interest</td>
<td>%</td>
<td>$145.00 (8.50%)</td>
<td>$12.33</td>
</tr>
<tr>
<td><strong>Total Variable Expenses</strong></td>
<td></td>
<td></td>
<td>$302.33</td>
</tr>
<tr>
<td><strong>Return Above Variable Expenses</strong></td>
<td></td>
<td></td>
<td>$307.68</td>
</tr>
<tr>
<td><strong>Fixed Expenses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinery</td>
<td>Acre</td>
<td>$115.28</td>
<td>$115.00</td>
</tr>
<tr>
<td>General Overhead</td>
<td>Acre</td>
<td>$20.00</td>
<td>$20.00</td>
</tr>
<tr>
<td>Cash Rent</td>
<td>Acre</td>
<td>$113.00</td>
<td>$150.00</td>
</tr>
<tr>
<td><strong>Total Fixed Expenses</strong></td>
<td></td>
<td></td>
<td>$285.00</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td></td>
<td></td>
<td>$587.33</td>
</tr>
<tr>
<td><strong>Return Above Specified Expenses</strong></td>
<td></td>
<td></td>
<td>$22.68</td>
</tr>
</tbody>
</table>

- Estimate the cost for the production cycle
  - Cash expenses
  - Non-cash expenses
- Sensitivity to changes in cost categories
- Determine breakeven
- Identify price points
Disaggregate Cash Prices

• Cash = Futures + Basis
  – Typically, 90%+ of price risk is in the futures market.
  – Need to evaluate strategies and tools that can be used to minimize risk for both.
  – Timing – Low basis levels the past three years due to the Mississippi river.
Monthly Real and Nominal Nearby Corn Futures Prices, 1980-2023 (Base = November 2023)
Monthly Real and Nominal Nearby Soybean Futures Prices, 1980-2023 (Base = November 2023)
Fence in a Price?

December corn currently at $4.74.

- Buy a $4.40 December Put option for $0.20 sets a $4.20 futures price floor.
- Sell a $5.70 December Call Option for $0.12.

Futures price range established between $4.20 to $5.70 for $0.08 premium.

- Set basis during the production year.
Execute and Evaluate

• Make all decisions based on well thought analysis and risk preferences.
  – Wishing and hoping ruin good marketing and risk management plans.

• Execute the strategy – be comfortable with the potential range of outcomes.

• Examine successes and failures from the strategy employed
  – Was the result what you expected?
  – Why or why not?
THANK YOU

Dr. S. Aaron Smith Associate Professor and Extension Economist
Department of Agricultural and Resource Economics
University of Tennessee Institute of Agriculture
Email: aaron.smith@utk.edu
Web Page: https://cropeconomics.tennessee.edu