

# Economic Feasibility of Biomass Crops in Western Kansas

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Ag Profitability Conference  
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## Outline of Presentation

- Introduction
- Historical Net Returns
- Non-Irrigated Crop Rotations
  - Output Prices
  - Switchgrass Yields
  - Net Returns
- Irrigated Crop Rotations
- Conclusions and Further Work

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## Biomass Project

- Objectives
  - Examine the feasibility of growing dedicated feed stocks and utilizing corn stover and wheat straw for biomass utilization in Kansas.
- **Important Note:**
  - **Results are very preliminary**
  - **Project involves computing breakeven prices for every region in Kansas and eventually every county in Kansas**

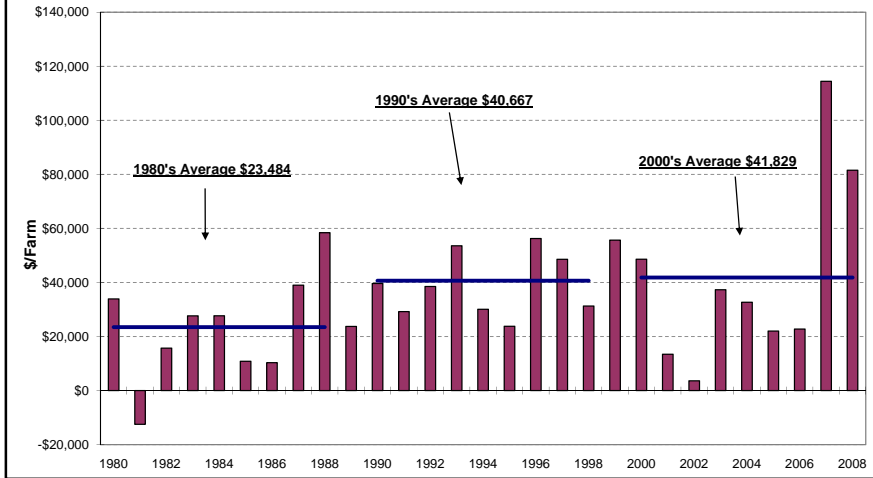
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## Historical Net Returns

- Whole-Farm Graphs:
  - Net Farm Income
  - Government Payments
  - Liquidity
  - Solvency
- Enterprise Net Returns
  - SW and NW KFMA

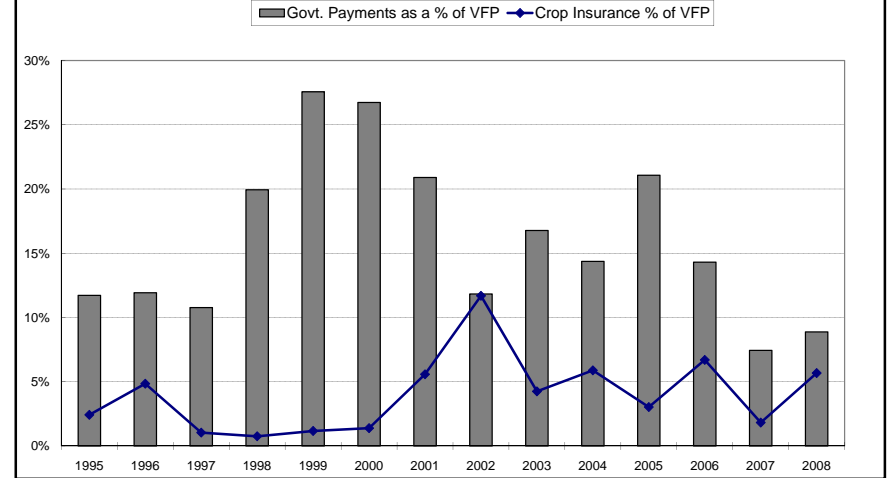
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### Southwest Kansas Farm Management Association Accrual Net Farm Income, 1980-2008



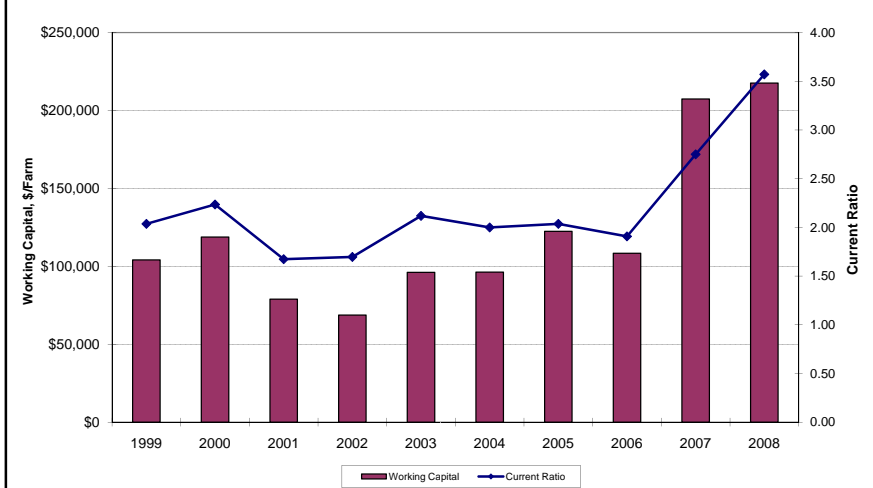
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### Southwest Kansas Farm Management Association Crop Insurance vs. Government Payments, 1995-2008



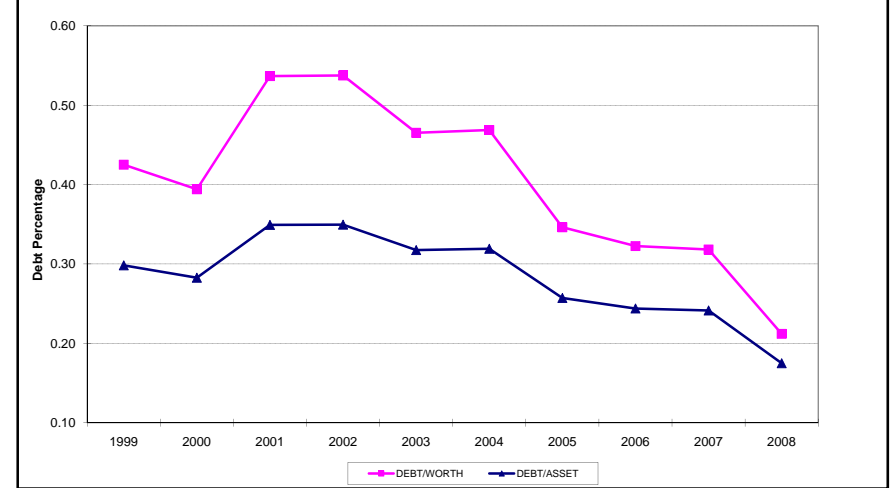
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### Southwest Kansas Farm Management Association Liquidity Trends, 1999-2008



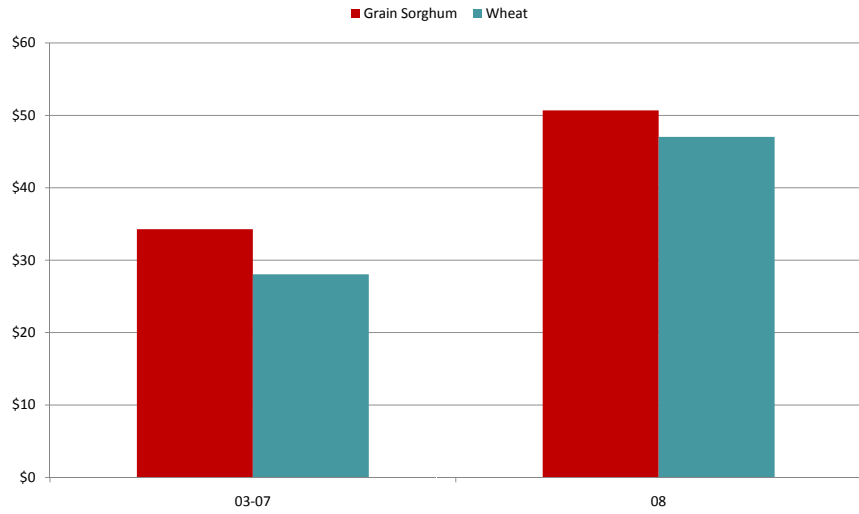
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### Southwest Kansas Farm Management Association Solvency Trends, 1999-2008

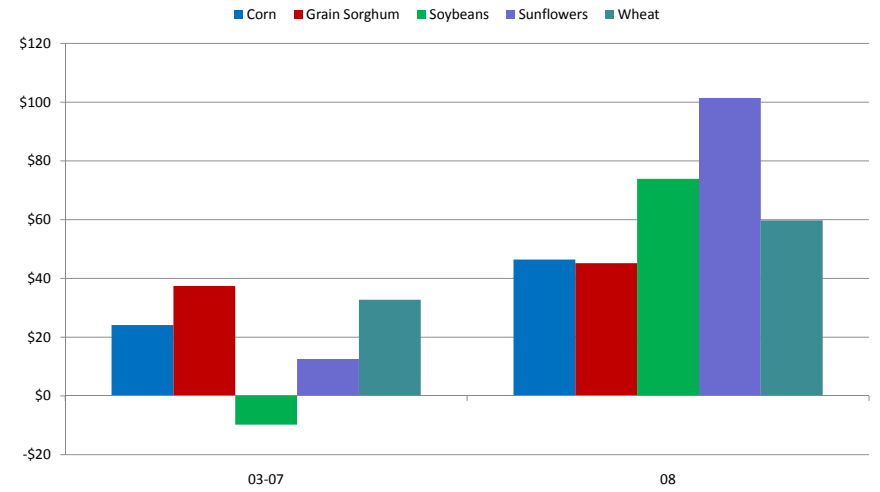


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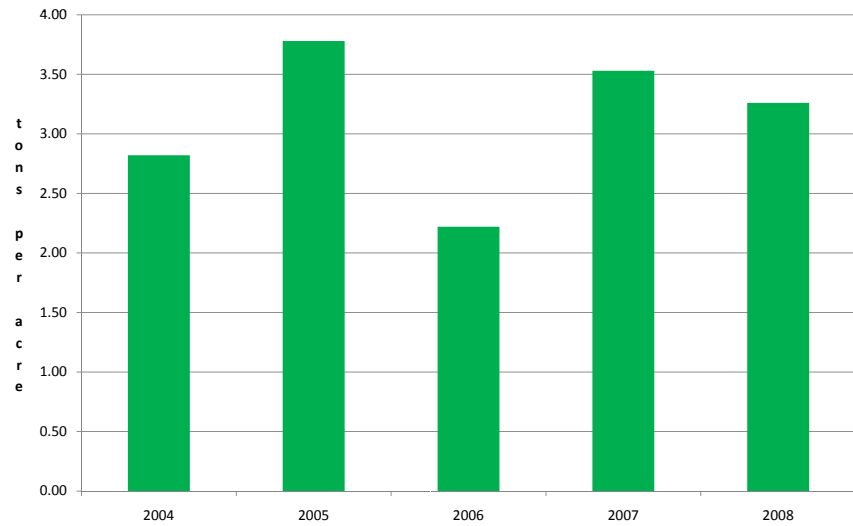
**Net Return to Land and Management per Acre - SW KFMA**



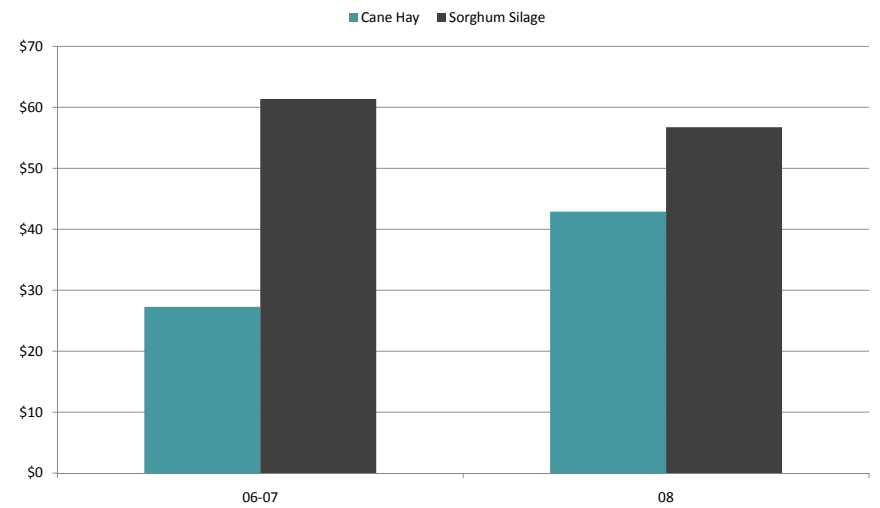
**Net Return to Land and Management per Acre - NW KFMA**



**Cane Hay Yields: NW KFMA**



**Net Return to Land and Management per Acre - NW KFMA**



# Non-Irrigated Crop Rotations

- Continuous Grain Sorghum (G)
- Wheat/Fallow (WF)
- Wheat/Grain Sorghum/Fallow (WGF)
- Wheat/Soybean/Fallow (WSoF)
- Wheat/Sunflower/Fallow (WSfF)
- Wheat/Cane Hay/Fallow (WCHF)
- Switchgrass (S)

# Non-Irrigated Crop Rotations Assumptions

- Output Prices
  - FAPRI Forecasts, 09/10 to 14/15
- Yields
  - Farm Management Guides (middle column)
- Input Costs
  - Farm Management Guides (middle column)

## Wheat Cost-Return Budget (W-S-F Rotation) in Western Kansas



Department of Agricultural Economics - [www.AgManager.info](http://www.AgManager.info)

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

Troy J. Dumler      Daniel M. O'Brien      Brian L.S. Olson      Kent L. Martin  
 Agricultural Economist      Agricultural Economist      Crops and Soils, NW      Crops and Soils, SW

INCOME PER ACRE	Yield Level, bu/ac			Your Farm
	35	45	55	
A. Yield per acre				
B. Price per bushel	\$4.68	\$4.68	\$4.68	
C. Net government payment	\$11.22	\$12.20	\$13.17	
D. Indemnity payments	\$0.00	\$0.00	\$0.00	
E. Miscellaneous income	\$0.00	\$0.00	\$0.00	
F. Returns/acre ((A x B) + C + D + E)	\$175.02	\$222.80	\$270.57	

### MF-903: Wheat Grown in Rotation

COSTS PER ACRE				
1. Seed	\$6.50	\$8.45	\$10.40	
2. Herbicide	9.44	9.44	9.44	
3. Insecticide / Fungicide	0.00	0.00	0.00	
4. Fertilizer and Lime	16.38	23.07	29.57	
5. Crop Consulting	0.00	0.00	0.00	
6. Crop Insurance	0.00	0.00	0.00	
7. Drying	0.00	0.00	0.00	
8. Miscellaneous	5.50	5.50	5.50	
9. Custom Hire / Machinery Expense	68.43	72.00	75.57	
10. Non-machinery Labor	7.73	8.14	8.54	
11. Irrigation				
a. Labor	0.00	0.00	0.00	
b. Fuel and Oil	0.00	0.00	0.00	
c. Repairs and Maintenance	0.00	0.00	0.00	
d. Depreciation on Equipment / Well	0.00	0.00	0.00	
e. Interest on Equipment	0.00	0.00	0.00	
12. Land Charge / Rent	48.00	60.00	72.00	
G. SUB TOTAL	\$161.98	\$186.60	\$211.02	
13. Interest on 1/2 Nonland Costs	4.27	4.75	5.21	
H. TOTAL COSTS	\$166.26	\$191.35	\$216.23	

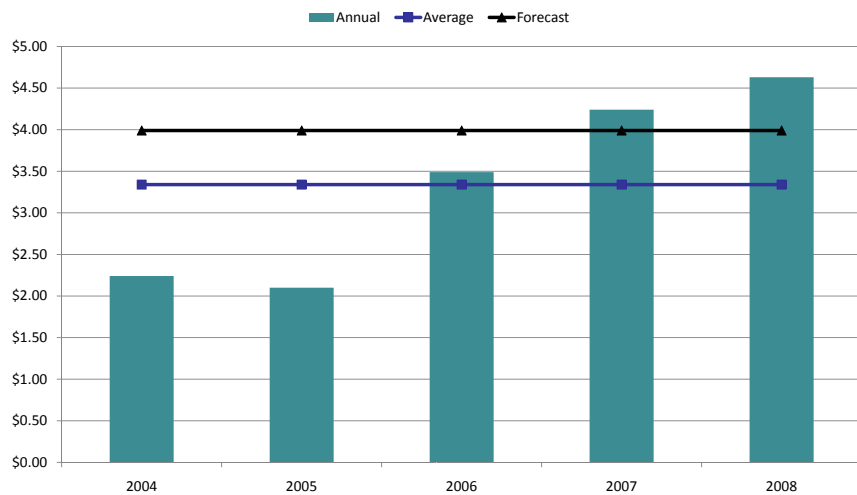
# Output Prices

- 5-Year Averages
  - KFMA, 2004 to 2008
- Price Projections, Major Crops
  - FAPRI
    - August 2009 Baseline Update
  - Basis
    - 10-year averages
- Switchgrass Price, \$75 per ton

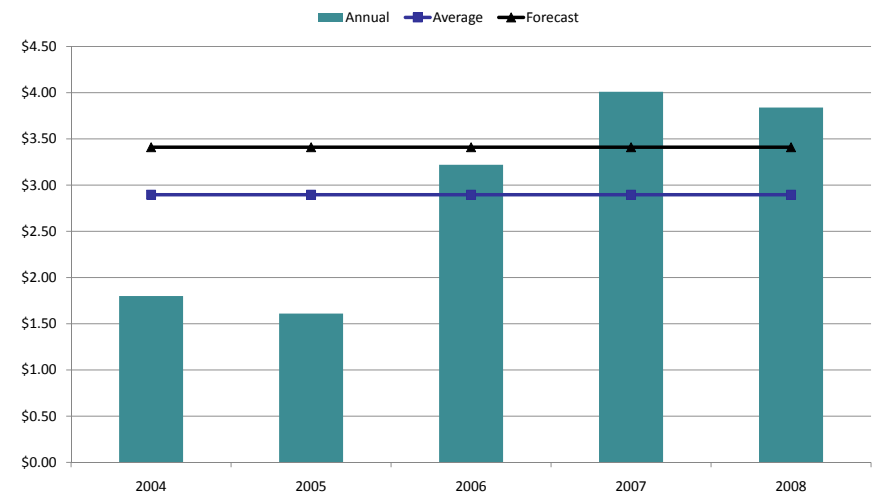
# Output Prices

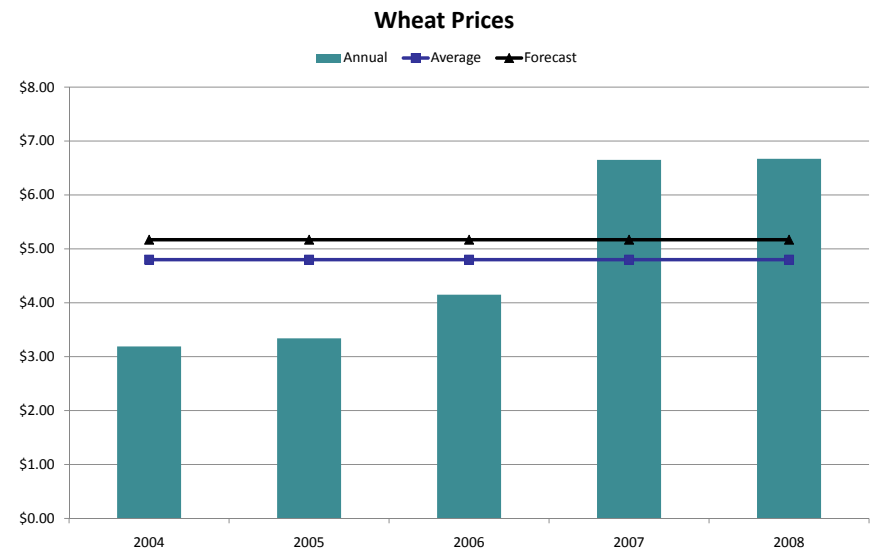
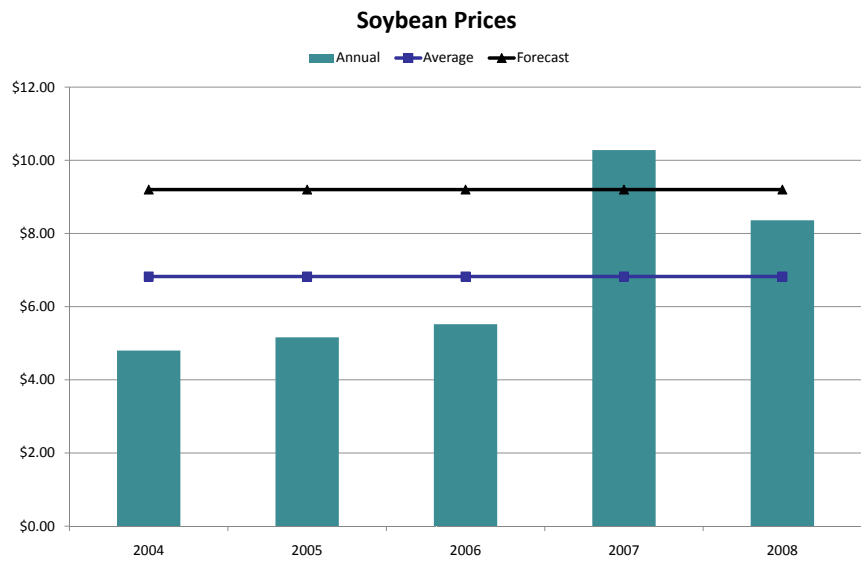
	5-Year Average (2004 to 2008)	Forecast (2009 to 2015)	Ratio (Forecast/Avg)
Corn	\$3.34	\$3.99	1.1946
Grain Sorghum	\$2.90	\$3.41	1.1775
Soybeans	\$6.82	\$9.20	1.3482
Wheat	\$4.80	\$5.17	1.0771

### Corn Prices



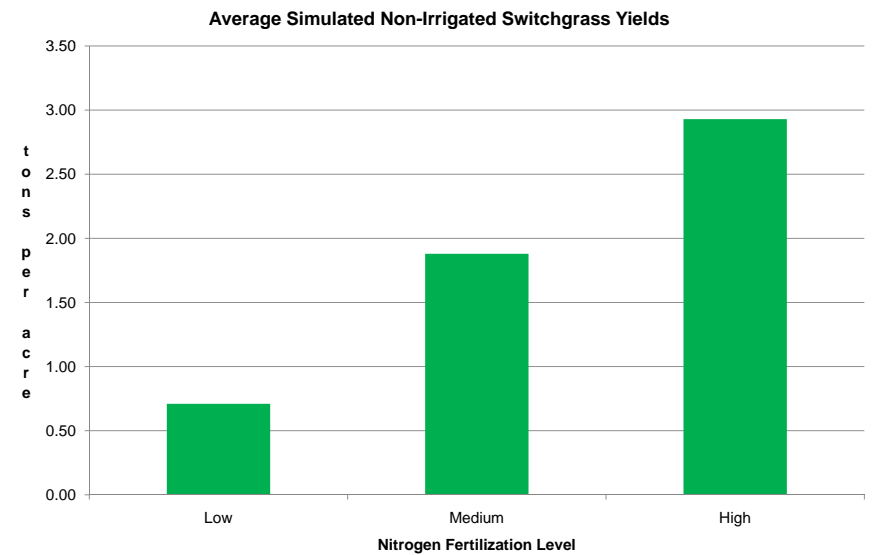
### Grain Sorghum Prices





## Simulated Non-Irrigated Switchgrass Yields

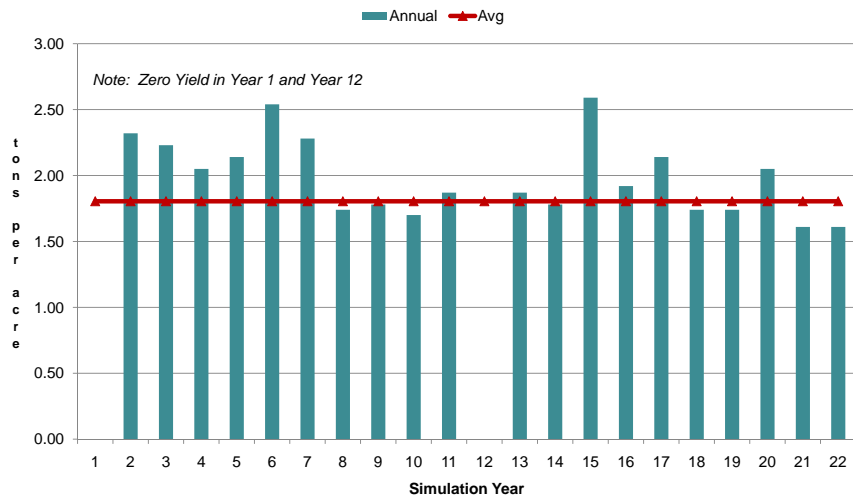
- N Rates
  - 0 lbs (Low)
  - 40 lbs (Medium)
  - 80 lbs (High)



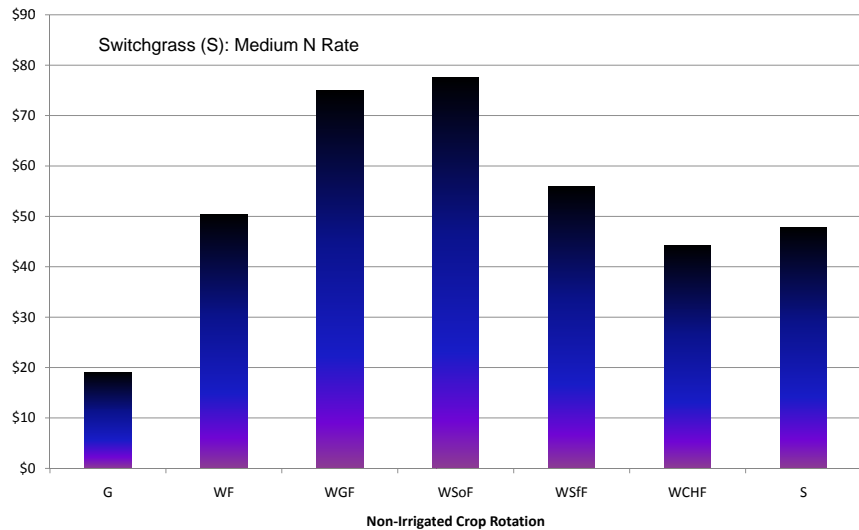
# Non-Irrigated Crop Rotations Projected Net Returns

- Net Returns to Land and Management
  - Rotations:
    - G, WF, WGF, WSoF, WSfF, WCHF, and S
- Breakeven Prices for Switchgrass
  - N Fertilization Levels:
    - Low, Medium, and High

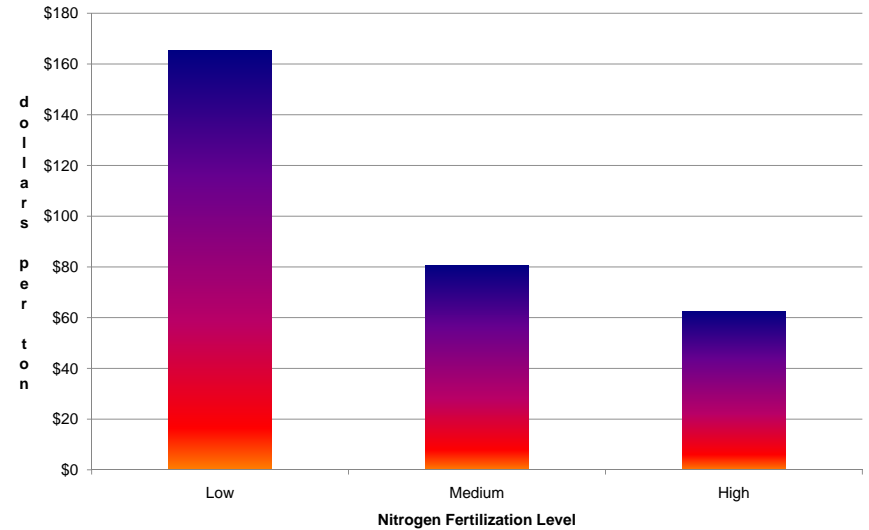
Simulated Non-Irrigated Switchgrass Yields: Medium N Rate



Projected Net Returns to Land and Management per Acre



Simulated Non-Irrigated Switchgrass Breakeven Prices



## Irrigated Crop Rotations

- Continuous Corn (C)
- Switchgrass (S)
- Will eventually also examine:
  - Forage Sorghum (FS)
  - Wheat (W)
  - Corn/Soybeans (CSo)
  - Corn/Sunflowers (CSf)
  - Grain Sorghum/Soybeans (GS)

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## Irrigated Crop Rotations Projected Net Returns

- Continuous Corn (C)
  - \$241.49 per acre
- Switchgrass (S)
  - \$132.27 per acre
- Breakeven Price for Switchgrass:
  - \$93.62 per ton

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## Conclusions

- This project is examining the feasibility of growing dedicated feed stocks and utilizing corn stover and wheat straw for biomass utilization in Kansas.
- This presentation focused on preliminary results for SW Kansas. Similar information is being generated for other regions.
- Key Issues:
  - First year of switchgrass production
  - Residue harvested
  - Uncertainty related to new crops or cropping practices

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  - Ag Manager Contributor Site ([www.agmanager.info](http://www.agmanager.info))
    - KFMA Newsletter
    - Recommendations for Further Reading

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