

# Producer Level Financial Impacts for Energy Crop Production

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## Abstract

The recent push towards developing the cellulosic biomass ethanol market has created producer level interest for the viability of growing suitable feedstock. This analysis illustrates the farm level financial implications of switching production to forage sorghum or sugarcane. Utilizing actual producer data from the Texas AgriLife Extension FARM Assistance program, a model farm was developed to determine the financial impacts on this operation with respect to potential energy crop scenarios.

## Results

The increased interest in cellulosic ethanol production will continue to spark interest in the different sources of biomass which can be produced by the farmer. This study looked at two different scenarios: 1) transferring rice acreage to forage sorghum and 2) transferring rice acreage to sugarcane. The forage sorghum scenario had the most significant effect on Net Cash Farm Income and Ending Cash Reserve values. These financial indicators grew at a much faster pace than those in the rice scenario. The sugarcane scenario also indicates the potential for viable energy crop production as it also suggests improved financial measures versus the rice scenario.

## Background

Developing the cellulosic process using biomass feedstock to produce ethanol is at the forefront of technology development. With the increased interest in cellulosic ethanol production, researchers are constantly looking for new sources of biomass which can be cost effective and readily available to ethanol plants. When/if the process becomes commercially viable will depend in no small part on the feasibility of sourcing a biomass feedstock. Forage sorghum and sugarcane have been offered as potential feedstock solutions. To induce a critical mass of feedstock, a production facility will need to bid production away from a producer's next best alternative.

## Assumptions

A 3,000 acre model Southeast Texas rice and hay farm was used to illustrate the financial impacts of converting rice and hay acreage to forage sorghum or sugarcane for the production of ethanol. The current production of this farm consists of 500 acres of rice and 1500 acres of hay being produced annually. It is assumed that the rice acreage must lay out of production for two consecutive years in order to combat yield losses. Ownership of the farm is assumed to be 50%, family living expenses are \$85,000 per year, and spouse off-farm income is expected to average \$25,000 per year. The two different scenarios illustrate the financial impacts alternative production systems have on the farm.

	Base	Forage Sorghum	Sugar Cane
	Planted acres		
Rice	500	250	250
Coastal hay	1500	750	750
Forage Sorghum	0	500	0
Sugarcane	0	0	1500
Grain sorghum (cover crop)	0	1000	0

Variable Costs/Acre	Seed	Chemicals	Fertilizer	Labor	Fuel	Repair & Maint.	Other/Custom/Irrigation	Expected Yield	Expected Price	Operating Loan
Rice	\$75.00	\$95.00	\$120.00	\$40.00	\$33.00	\$33.00	\$80.00	75 cwt	\$11.03	8.50%
Coastal Hay	\$0	\$10.00	\$123.00	\$12.00	\$8.00	\$3.00	\$0	9 tons	\$88.19	8.50%
Forage Sorghum	\$100.00	\$47.00	\$120.00	\$20.00	\$20.00	\$15.00	\$0	15 tons	\$35.37	8.50%
Sugarcane	\$660.00	\$47.00	\$27.50	\$12.00	\$8.00	\$3.00	\$0	15 tons	\$26.86	8.50%
Grain Sorghum	\$8.82	\$23.18	\$47.93	\$7.00	\$15.00	\$11.00	\$35.43	80 bu	\$3.64	8.50%

Crop Receipts (\$1000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2007-2016 Average
1 - Rice & Coastal Hay Scenario	1,507.33	1,387.75	1,373.58	1,365.19	1,377.83	1,385.37	1,407.49	1,394.69	1,391.89	1,381.77	1,397.29
2 - Forage Sorghum Scenario	1,302.77	1,268.21	1,259.39	1,260.01	1,270.28	1,270.66	1,283.82	1,289.07	1,287.91	1,281.75	1,277.39
3 - Sugarcane Scenario	1,144.89	1,293.47	1,302.38	1,247.07	1,203.62	1,118.72	703.74	1,133.25	1,363.43	1,376.20	1,188.68
<b>Crop Expenses (\$1000)</b>											
1 - Rice & Coastal Hay Scenario	1,066.42	1,095.21	1,098.34	1,095.41	1,092.07	1,084.17	1,088.05	1,088.80	1,102.19	1,103.65	1,091.43
2 - Forage Sorghum Scenario	872.13	894.25	897.86	898.63	899.81	897.80	903.22	907.76	919.37	925.16	901.60
3 - Sugarcane Scenario	1,669.46	625.45	627.70	626.97	626.35	623.22	544.02	1,816.60	636.21	638.41	843.44
<b>Net Cash Farm Income (\$1000)</b>											
1 - Rice & Coastal Hay Scenario	349.75	212.47	195.57	193.68	200.57	214.84	230.64	218.04	210.06	191.72	221.73
2 - Forage Sorghum Scenario	339.89	291.88	283.75	289.34	294.91	297.39	307.26	310.74	303.72	292.15	301.10
3 - Sugarcane Scenario	-649.20	527.18	566.40	541.45	506.92	433.47	106.51	-797.53	607.31	650.75	249.53
<b>Ending Cash Reserves (\$1000)</b>											
1 - Rice & Coastal Hay Scenario	141.60	174.92	183.61	186.91	178.84	196.23	225.91	240.47	239.56	236.06	
2 - Forage Sorghum Scenario	138.00	226.79	298.89	364.39	415.44	490.35	570.70	647.92	711.28	779.44	
3 - Sugarcane Scenario	-754.13	-341.50	-21.71	210.98	398.75	554.87	493.54	-435.97	20.48	389.14	
<b>Real Net Worth (\$1000)</b>											
1 - Rice & Coastal Hay Scenario	2,700.82	2,954.83	3,062.23	3,155.00	3,240.79	3,324.18	3,413.75	3,484.81	3,536.30	3,573.24	
2 - Forage Sorghum Scenario	2,697.30	3,004.94	3,171.47	3,320.05	3,456.32	3,586.19	3,713.74	3,831.13	3,928.01	4,013.96	
3 - Sugarcane Scenario	1,823.51	2,455.92	2,867.68	3,177.38	3,441.12	3,643.67	3,646.61	2,909.84	3,354.38	3,697.39	

Figure 1. Projected Variability in Net Cash Farm Income for the Rice Scenario.

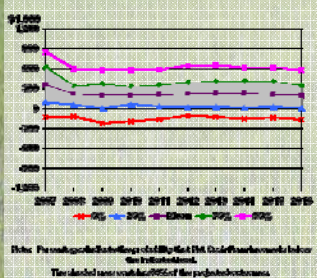


Figure 2. Ending Cash Reserves and Probability of Having to Refinance Operating Note for the Rice Scenario.

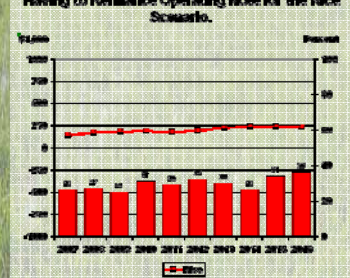


Figure 3. Projected Variability in Net Cash Farm Income for the Forage Sorghum Scenario.

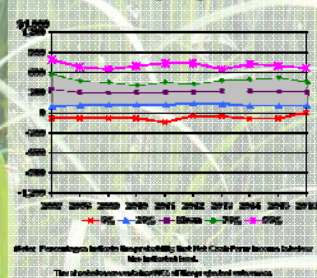


Figure 4. Ending Cash Reserves and Probability of Having to Refinance Operating Note for the Rice Scenario and Forage Sorghum Scenario.

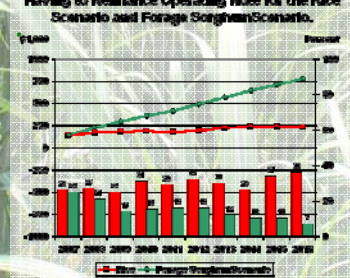


Figure 5. Projected Variability in Net Cash Farm Income for the Sugarcane Scenario.

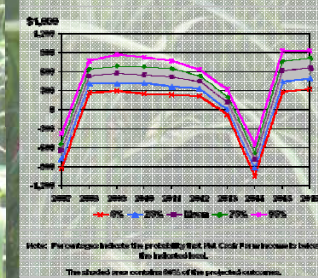


Figure 6. Ending Cash Reserves and Probability of Having to Refinance Operating Note for the Rice Scenario and Sugarcane.

