

# **Guideline Switchgrass Establishment And Annual Production Budgets Over Three Year Planning Horizon**

**Estimated Production Expenses as of  
July 14, 2009**

These guideline switchgrass budgets are for use by farmers considering participation in the Biofuels Initiative.

E12-4115-00-001-08

# SWITCHGRASS PLANNING BUDGETS

## TRADE NAMES AND PESTICIDE CAUTION

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others which may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product.

Pesticides recommended in the publication were registered for the prescribed uses when this manual was printed. Pesticide registrations are continuously being reviewed. Should registration of a recommended pesticide be canceled, it will no longer be recommended by The University of Tennessee.

In order to protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide.

According to laws regulating pesticides, they must be used only as directed by the label.

**THESE PRODUCTS ARE INTENDED AS A GUIDE ONLY.  
ADJUSTMENTS CAN BE AND SHOULD BE MADE WHEN NEEDED.**

Each farm has a unique set of resources. Guideline budgets should be adjusted for each farm in terms of projected yields and costs.

**Research completed as part of a Department of Energy Switchgrass project in West Tennessee provided the foundation for this publication.**

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Table 1

**SWITCHGRASS NO-TILLAGE ESTABLISHMENT: 3 YEAR PLANNING HORIZON**  
**ESTIMATED EXPENSES PER ACRE**

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>PRICE</u>	<u>AMOUNT</u>	<u>YOUR FARM</u>
<b>REVENUE</b>						
SWITCHGRASS	BIOMASS	TON	0	0	\$0.00	_____
<b>VARIABLE EXPENSES (1)</b>						
SEED (2)	PLS (PURE LIVE SEED)	LB.	6	\$0.00	\$0.00	_____
FERTILIZER (3) (4)	P2O5	LB.	40	\$0.80	\$32.00	_____
	K2O	LB.	80	\$0.75	\$60.00	_____
<b>WEED CONTROL (5)</b>						
FALL BURNDOWN	GLYPHOSATE	QT.	1	\$7.87	\$7.87	_____
SPRING BURNDOWN	GLYPHOSATE	QT.	1.5	\$7.87	\$11.81	_____
POST-EMERGE	BROADLEAF HERBICIDE	PT.	2	\$2.50	\$5.00	_____
POST-EMERGE	GRASS HERBICIDE	ACRE	1	\$8.00	\$8.00	_____
POST-EMERGE	GRASS HERBICIDE	ACRE	1	\$8.00	\$8.00	_____
MACHINERY REPAIR		AC.	1	\$8.07	\$8.07	_____
MACHINERY FUEL	DIESEL @ \$2.50 /GALLON	AC.	1	\$11.31	\$11.31	_____
OPERATING CAPITAL	6 MONTHS	AC.	\$152.05	8.00%	\$6.08	_____
TOTAL VARIABLE EXPENSES					\$158.14	_____
<b>MACHINERY EXPENSES</b>						
MACHINERY DEPRECIATION		AC.	1	\$8.70	\$8.70	_____
INTEREST EXPENSE	MACHINERY & EQUIP.	AC.	1	\$6.09	\$6.09	_____
MACHINERY COST					\$14.79	_____
<b>LABOR EXPENSES</b>						
LABOR		HR.	0.68	\$9.75	\$6.59	_____
LABOR COST					\$6.59	_____
<b>TOTAL ESTABLISHMENT COST</b>					\$179.52	_____
<b>ESTABLISHMENT COST PRORATED OVER 3 YEARS</b>		ANNUAL	\$179.52	8.00%	\$69.66	_____

**FOOTNOTES**

- (1) SWITCHGRASS ESTABLISHED USING SPRING SEEDING WITH A NO-TILL DRILL.
- (2) THERE IS A WIDE RANGE IN SEED PRICES. THE RECOMMENDED SEEDING RATE IS 8 POUNDS OF PURE LIVE SEED PER ACRE.
- (3) ASSUMES A SOIL TEST LOW IN P&K. **IF SOIL TEST VALUES ARE MEDIUM OR HIGH IN P&K, NO P2O5 OR K2O IS RECOMMENDED.** COST OF RENTING SPREADER IS INCLUDED IN THE FERTILIZER PRICE.
- (4) LIME IS NOT RECOMMENDED IF THE SOIL PH IS 5.0 OR ABOVE.
- (5) APPROPRIATE WEED CONTROL MEASURES VARY GREATLY ACCORDING TO PREVIOUS CROPPING HISTORY AND SPECIFIC WEED VARIETIES. CAREFULLY EVALUATE FIELDS AND ADJUST THE BUDGET ACCORDINGLY.

Table 2

**SWITCHGRASS NO-TILLAGE ESTABLISHMENT: 3 YEAR PLANNING HORIZON**  
**ESTIMATED LABOR, POWER AND MACHINERY INPUTS**

MONTH	OPERATION	EQUIPMENT	HOURS PER ACRE	
			MACHINE	LABOR
AUGUST	BURNDOWN/PRE-EMERGE	Sprayer, 60' boom	0.03	0.03
MAY	PLANT	No-till drill, 16 row @ 7.5" spacing	0.24	0.29
	BURNDOWN/PRE-EMERGE	Sprayer, 60' boom	0.03	0.03
	SPREAD FERTILIZER POST-EMERGE	Tractor, 150H.P.,W/Cab, Air	0.07	0.08
	SPRAY(3X)	Sprayer, 60' boom	0.08	<u>0.10</u>
	BUSHHOGGING	Rotary Mower 15'	0.10	<u>0.12</u>
		<b>TOTAL</b>		<b>0.68</b>

MACHINE	HOURS PER ACRE	--- INTEREST COST ---		- COST PER HOUR -		--- COST PER ACRE ---			
		PER HOUR	PER ACRE	F.C.	V.C.	FIXED	REPAIR	FUEL	VAR
Tractor, 150 HP	0.54	\$5.84	\$3.16	\$ 8.21	\$29.04	\$4.44	\$4.38	\$11.31	\$15.69
No-till Drill	0.24	\$6.80	\$1.60	\$11.49	\$ 8.50	\$2.71	\$2.00	\$ 0.00	\$ 2.00
Sprayer, 60' boom	0.14	\$3.36	\$0.47	\$ 5.78	\$ 3.92	\$0.81	\$0.55	\$ 0.00	\$ 0.55
Rotary Mower 15'	0.10	\$8.82	\$0.87	\$ 7.62	\$11.57	\$0.75	\$1.14	\$ 0.00	\$ 1.14
<b>TOTAL</b>			<b>\$6.09</b>			<b>\$8.70</b>	<b>\$8.07</b>	<b>\$11.31</b>	<b>\$19.38</b>

-- PLEASE NOTE: TOTALS MAY BE DIFFERENT DUE TO ROUNDING. ---

Table 3

**SWITCHGRASS NO-TILLAGE RESEEDING: YEAR 2 OF 3 YEAR PLANNING HORIZON**  
**ESTIMATED EXPENSES PER ACRE**

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>PRICE</u>	<u>AMOUNT</u>	<u>YOUR FARM</u>
<b>REVENUE</b>						
SWITCHGRASS	BIOMASS	TON	0	0	\$0.00	_____
<b>VARIABLE EXPENSES (1)</b>						
SEED (2)	PLS (PURE LIVE SEED)	LB.	6	\$0.00	\$0.00	_____
FERTILIZER (3) (4)	P2O5	LB.	40	\$0.80	\$32.00	_____
	K2O	LB.	80	\$0.75	\$60.00	_____
<b>WEED CONTROL</b>						
FALL BURNDOWN	GLYPHOSATE	QT.	1	\$7.87	\$7.87	_____
SPRING BURNDOWN	GLYPHOSATE	QT.	1.5	\$7.87	\$11.81	_____
POST-EMERGE	BROADLEAF HERBICIDE	PT.	2	\$2.50	\$5.00	_____
POST-EMERGE	GRASS HERBICIDE	ACRE	1	\$8.00	\$8.00	_____
POST-EMERGE	GRASS HERBICIDE	ACRE	1	\$8.00	\$8.00	_____
MACHINERY REPAIR		AC.	1	\$8.07	\$8.07	_____
MACHINERY FUEL	DIESEL @ \$2.50/GALLON	AC.	1	\$11.31	\$11.31	_____
OPERATING CAPITAL	6 MONTHS	AC.	\$152.05	8.00%	\$6.08	_____
					TOTAL VARIABLE EXPENSES	\$158.14 _____
<b>MACHINERY EXPENSES</b>						
MACHINERY DEPRECIATION		AC.	1	\$8.70	\$8.70	_____
INTEREST EXPENSE	MACHINERY & EQUIP.	AC.	1	\$6.09	\$6.09	_____
					MACHINERY COST	\$14.79 _____
<b>LABOR EXPENSES</b>						
LABOR		HR.	0.68	\$9.75	\$6.59	_____
					LABOR COST	\$6.59 _____
<b>TOTAL ESTABLISHMENT COST</b>					\$179.52	_____
<b>RESEEDING COST PRORATED OVER 2 YEARS</b>		ANNUAL	\$35.90	8.00%	\$20.13	_____

**FOOTNOTES**

- (1) SWITCHGRASS ESTABLISHED USING SPRING SEEDING WITH A NO-TILL DRILL. THE PROBABILITY OF RESEEDING SPRING SEEDED SWITCHGRASS IS ESTIMATED TO BE 20%.
- (2) THERE IS A WIDE RANGE IN SEED PRICES. THE RECOMMENDED SEEDING RATE IS 8 POUNDS OF PURE LIVE SEED PER ACRE.
- (3) ASSUMES A SOIL TEST LOW IN P&K. **IF SOIL TEST VALUES ARE MEDIUM OR HIGH IN P&K, NO P2O5 OR K2O IS RECOMMENDED.** COST OF RENTING SPREADER IS INCLUDED IN THE FERTILIZER PRICE. RESEEDING ASSUMES NO HARVEST OF SWITCHGRASS AND NO LOSS OF SOIL NUTRIENTS. THEREFORE NO P2O5 OR K2O APPLICATIONS ARE NECESSARY.
- (4) LIME IS NOT RECOMMENDED IF THE SOIL PH IS 5.0 OR ABOVE.

Table 4

**SWITCHGRASS NO-TILLAGE RESEEDING: YEAR 2 OF 3 YEAR PLANNING HORIZON  
ESTIMATED LABOR, POWER AND MACHINERY INPUTS**

MONTH	OPERATION	EQUIPMENT	HOURS PER ACRE	
			MACHINE	LABOR
AUGUST	BURNDOWN/PRE-EMERGE	Sprayer, 60' boom	0.03	0.03
MAY	PLANT	No-till drill, 16 row @ 7.5" spacing	0.24	0.29
	BURNDOWN/PRE-EMERGE	Sprayer, 60' boom	0.03	0.03
	SPREAD FERTILIZER	Tractor, 150H.P.,W/Cab, Air	0.07	0.08
	POST-EMERGE SPRAY (3X)	Sprayer, 60' boom	0.08	<u>0.10</u>
	BUSHHOGGING	Rotary Mower 15'	0.10	<u>0.12</u>
		<b>TOTAL</b>		<b>0.68</b>

MACHINE	HOURS PER ACRE	--- INTEREST COST ---		- COST PER HOUR -		--- COST PER ACRE ---			
		PER HOUR	PER ACRE	F.C.	V.C.	FIXED	REPAIR	FUEL	VAR
Tractor, 150 HP	0.54	\$5.84	\$3.16	\$ 8.21	\$29.04	\$4.44	\$4.38	\$11.31	\$15.69
No-till Drill	0.24	\$6.80	\$1.60	\$11.49	\$ 8.50	\$2.71	\$2.00	\$ 0.00	\$ 2.00
Sprayer, 60' boom	0.14	\$3.36	\$0.47	\$ 5.78	\$ 3.92	\$0.81	\$0.55	\$ 0.00	\$ 0.55
Rotary Mower 15'	0.10	\$8.82	\$0.87	\$ 7.62	\$11.57	\$0.75	\$1.14	\$ 0.00	\$ 1.14
<b>TOTAL</b>			<b>\$6.09</b>			<b>\$8.70</b>	<b>\$8.07</b>	<b>\$11.31</b>	<b>\$19.38</b>

--- PLEASE NOTE: TOTALS MAY BE DIFFERENT DUE TO ROUNDING. ---

Table 5

**SWITCHGRASS ANNUAL PRODUCTION BUDGET: 3 YEAR PLANNING HORIZON**  
**ESTIMATED EXPENSES PER ACRE**

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>PRICE</u>	<u>AMOUNT</u>	<u>YOUR FARM</u>
<b>REVENUE</b>						
SWITCHGRASS	BIOMASS	TON	0	0	\$0.00	_____
<b>VARIABLE EXPENSES</b>						
FERTILIZER (1) (2)	NITROGEN	LB.	60	\$0.76	\$45.60	_____
	P2O5	LB.	40	\$0.80	\$32.00	_____
	K2O	LB.	80	\$0.75	\$60.00	_____
TRIPLE TIE	TWINE, 1500 LB. BALE	BALE	5.9	\$1.75	\$10.33	_____
WEED CONTROL						
POST-EMERGE	BROADLEAF HERBICIDE	PT.	2	\$2.50	\$5.00	_____
POST-EMERGE	GRASS HERBICIDE	ACRE	1	\$8.00	\$8.00	_____
MACHINERY REPAIR		AC.	1	\$30.51	\$30.51	_____
MACHINERY FUEL	DIESEL @ \$2.50	AC.	1	\$42.56	\$42.56	_____
OPERATING CAPITAL	6 MONTHS	AC.	\$233.99	8.00%	\$9.36	_____
					TOTAL VARIABLE EXPENSES	\$243.35 _____
<b>MACHINERY EXPENSES</b>						
MACHINERY DEPRECIATION		AC.	1	\$34.21	\$34.21	_____
INTEREST EXPENSE	MACHINERY & EQUIP.	AC.	1	\$18.12	\$18.12	_____
					MACHINERY COST	\$52.34 _____
<b>LABOR EXPENSES</b>						
LABOR		HR.	2.54	\$9.75	\$24.77	_____
					LABOR COST	\$24.77 _____
<b>PRORATED ESTABLISHMENT COST (3)</b>					\$69.66	_____
<b>PRORATED RESEEDING COST (4)</b>					\$20.13	_____
<b>PRODUCTION COST, EXCLUDING LAND AND MANAGEMENT CHARGES</b>					\$410.26	_____

**FOOTNOTES**

- (1) ASSUMES A SOIL TEST LOW IN P&K. **IF SOIL TEST VALUES ARE MEDIUM OR HIGH IN P&K, NO P2O5 OR K2O IS RECOMMENDED.** COST OF RENTING SPREADER IS INCLUDED IN THE FERTILIZER PRICE.
- (2) LIME IS NOT RECOMMENDED IF THE SOIL PH IS 5.0 OR ABOVE.
- (3) SEE SWITCHGRASS ESTABLISHMENT BUDGET.
- (4) SEE SWITCHGRASS RESEEDING BUDGET.



Table 6

**SWITCHGRASS ANNUAL PRODUCTION BUDGET: 3 YEAR PLANNING HORIZON**  
**ESTIMATED LABOR, POWER AND MACHINERY INPUTS**

MONTH	OPERATION	EQUIPMENT	HOURS PER ACRE	
			MACHINE	LABOR
MAY	HERBICIDE SPRAY	Sprayer, 60' boom	0.03	0.03
	HERBICIDE SPRAY	Sprayer, 60' boom	0.03	0.03
	SPREAD FERTILIZER	Tractor, 150H.P.,W/Cab, Air	0.07	0.08
NOV/DEC	MOW	Mower	0.26	0.33
	RAKE	Rake	0.17	0.21
	BALE	Round Baler, PTO, Large Round	0.75	0.94
	STAGE/LO			
	AD	Front End Loader	0.73	<u>0.91</u>
			<b>TOTAL</b>	<b>2.54</b>

MACHINE	HOURS PER ACRE	--- INTEREST COST---		--- COST PER HOUR ---		--- COST PER ACRE ---			
		PER HOUR	PER ACRE	F.C.	V.C.	FIXED	REPAIR	FUEL	VAR
Tractor, 150 HP	2.03	\$5.84	\$11.87	\$ 8.21	\$29.04	\$16.69	\$16.47	\$42.56	\$59.03
Sprayer	0.03	\$3.36	\$ 0.09	\$ 5.78	\$ 3.92	\$ 0.16	\$ 0.11	\$ 0.00	\$ 0.11
Mower	0.26	\$1.95	\$ 0.51	\$ 3.30	\$ 4.88	\$ 0.86	\$ 1.27	\$ 0.00	\$ 1.27
Rake	0.17	\$1.00	\$ 0.17	\$ 1.37	\$ 0.72	\$ 0.23	\$ 0.12	\$ 0.00	\$ 0.12
Baler	0.75	\$4.38	\$ 3.29	\$14.62	\$13.80	\$10.96	\$10.35	\$ 0.00	\$10.35
Loader	0.73	\$3.00	\$ 2.19	\$ 7.27	\$ 3.00	\$ 5.31	\$ 2.19	\$ 0.00	\$ 2.19
<b>TOTAL</b>			<b>\$18.12</b>			<b>\$34.21</b>	<b>\$30.51</b>	<b>\$42.56</b>	<b>\$73.07</b>

-- PLEASE NOTE: TOTALS MAY BE DIFFERENT DUE TO ROUNDING --

# Switchgrass Establishment Expenses

3 Year Planning Horizon

July 8, 2009

	Low Testing Soil		Medium Testing Soil	
	Producer	Initiative	Producer	Initiative

Variable Expenses	\$158.14	\$120.00	\$ 62.46	\$120.00
Depreciation	\$ 14.79	\$ -----	\$ 14.79	\$ -----
Labor	\$ 6.59	\$ -----	\$ 6.59	\$ -----
<b>Total Establishment</b>	<b>\$179.52</b>	<b>\$120.00</b>	<b>\$ 83.84</b>	<b>\$120.00</b>
-----				
Prorated over 3 Years				
@8% for Producer	\$ 69.66	\$ 40.00	\$ 32.53	\$ 40.00
Reseeding	\$ 20.13	\$ 12.00	\$ 9.40	\$ 12.00
<b>Total</b>	<b>\$ 89.79</b>	<b>\$ 52.00</b>	<b>\$ 41.93</b>	<b>\$ 52.00</b>

# Annual Switchgrass Production Expenses

3 Year Planning Horizon

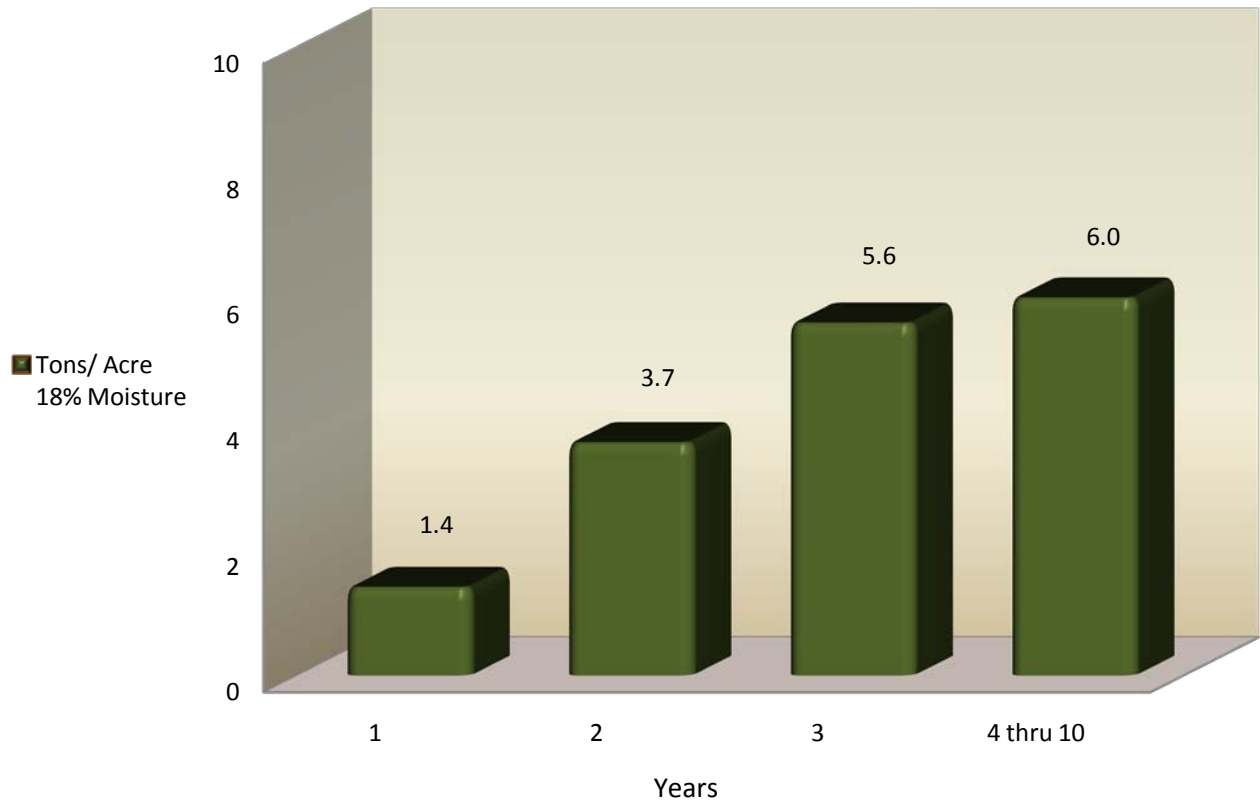
July 8, 2009

	Low Testing Soil		Medium Testing Soil
	Producer	Initiative	Producer
			Initiative

Variable Expenses	\$243.36	\$ -----	\$147.68	\$ -----
Depreciation	\$ 52.34	\$ -----	\$ 52.34	\$ -----
Labor	\$ 24.77	\$ -----	\$ 24.77	\$ -----
<b>Total Annual</b>	<b>\$320.47</b>	<b>\$ -----</b>	<b>\$224.79</b>	<b>\$ -----</b>
-----				
Establishment Cost/ 3 Years	\$ 89.79	\$ 52.00	\$ 41.93	\$ 52.00
<b>Total *</b>	<b>\$410.26</b>	<b>\$ 52.00</b>	<b>\$266.72</b>	<b>\$ 52.00</b>

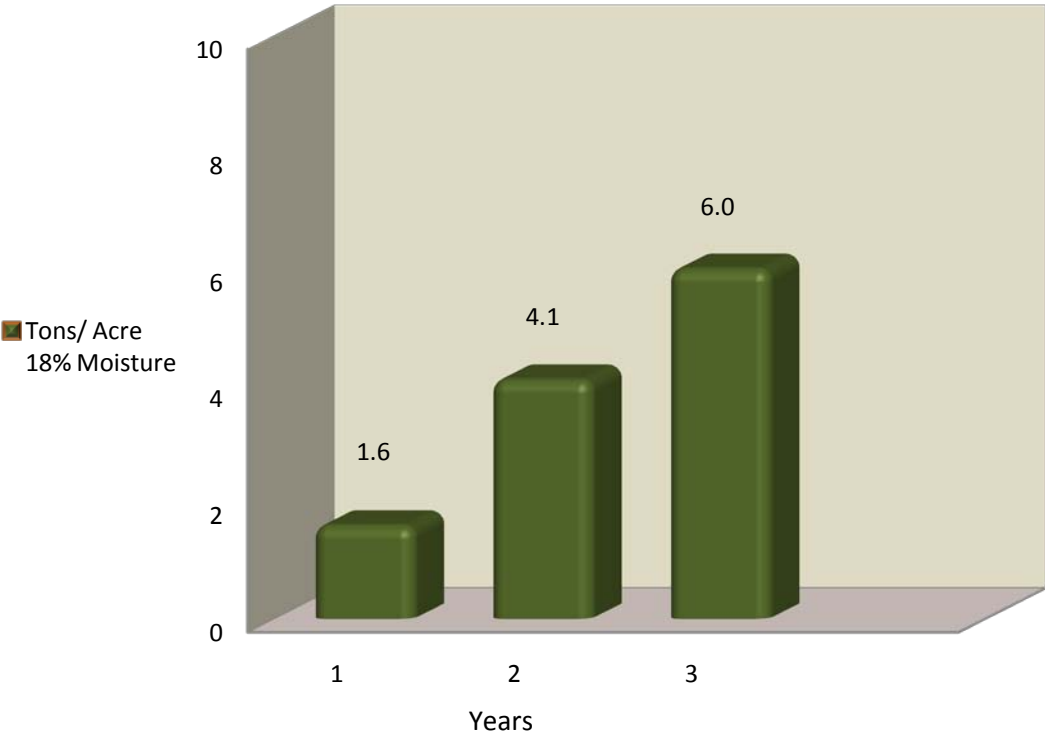
\*Does not include a charge for land, management and risks.

# Switchgrass Yields @ 18% Moisture by Production Year with Reseeding 20% the First Year



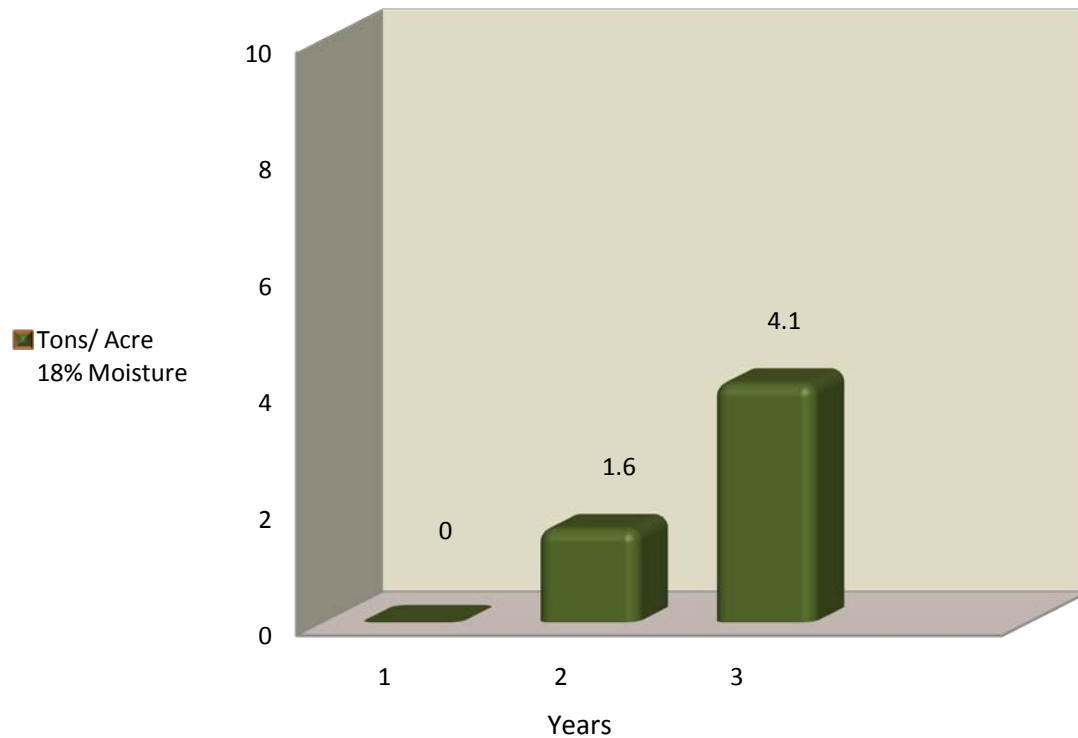
Year	Receipts	Low Testing Soil Return to Land, Management and Risks/ Acre	Medium Testing Soil Return to Land, Management and Risks/ Acre
1	\$450/ Acre \$0/ Ton x 1.4 Tons = \$0 \$450	\$40	\$183
2	\$250/ Acre \$40/ Ton x 3.7 Tons = \$148 \$398	-\$12	\$131
3	\$150/ Acre \$50/ Ton x 5.6 Tons = \$280 \$430	\$20	\$163
Tons/ Year	3.6 Tons	\$16	\$159
Receipts/ Year	\$426		
4 Thru 10	6-8 Tons	?	?

# Switchgrass Yields by Production Year with Stand Established and Harvested the First Year



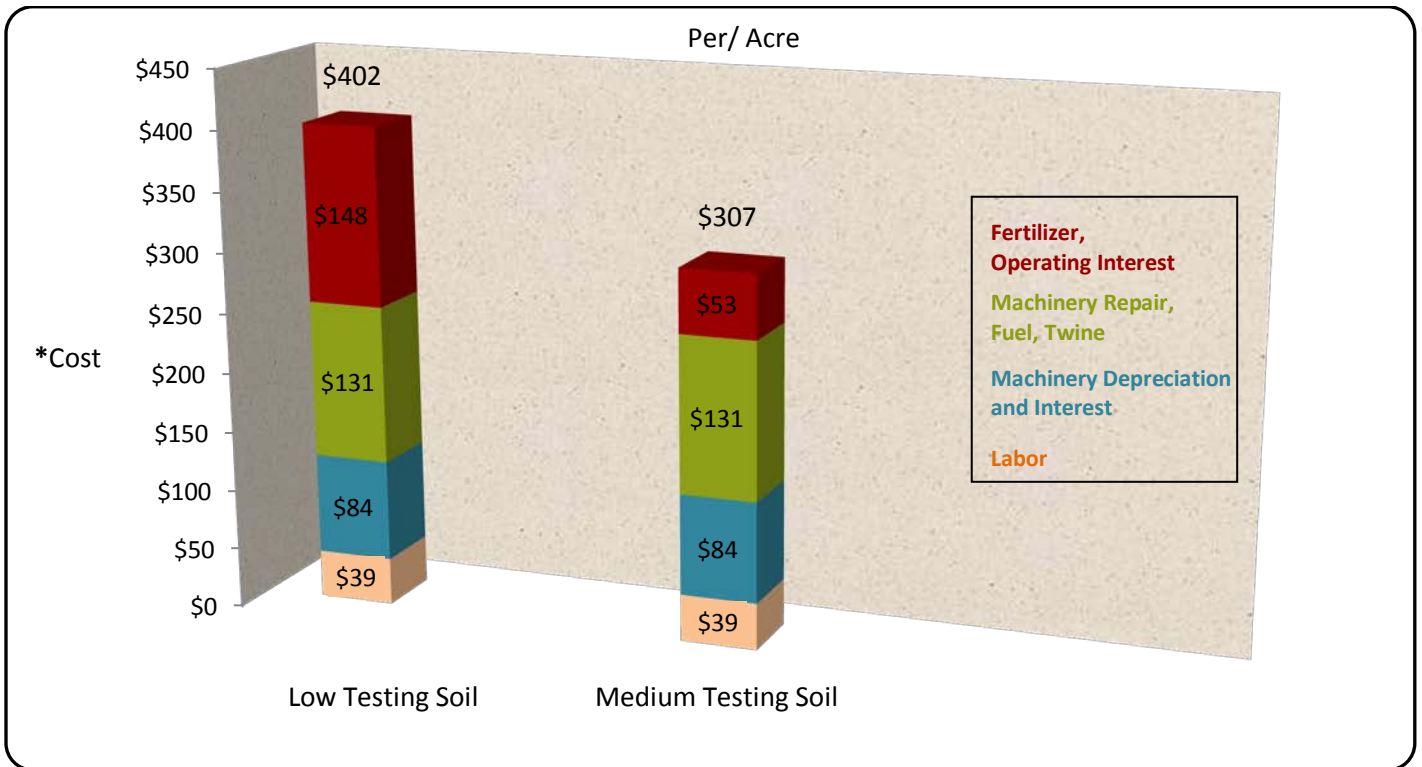
Year	Receipts	Low Testing Soil Return to Land, Management and Risks/ Acre	Medium Testing Soil Return to Land, Management and Risks/ Acre
1	\$450/ Acre \$0/ Ton x 1.6 Tons = \$0 \$450	\$40	\$183
2	\$250/ Acre \$40/ Ton x 4.1 Tons = \$164 \$414	\$ 4	\$147
3	\$150/ Acre \$50/ Ton x 6.0 Tons = \$300 \$450	\$40	\$183
Tons/ Year	3.9 Tons	\$28	\$171
Receipts/ Year	\$438		

# Switchgrass Yields @ 18% Moisture by Production Year with No Stand/ Harvest in Year 1

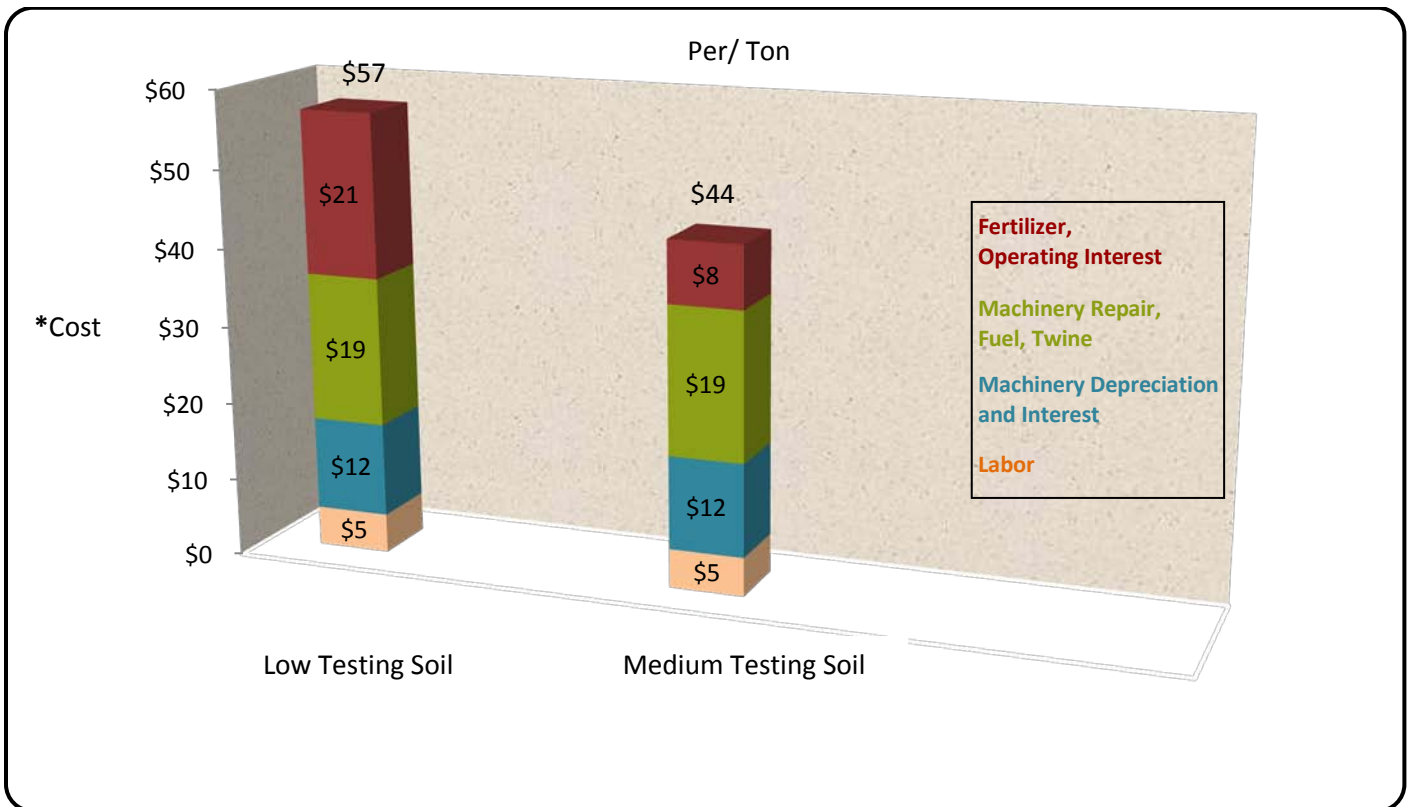


Year	Receipts	Low Testing Soil Return to Land, Management and Risks/ Acre	Medium Testing Soil Return to Land, Management and Risks/ Acre
1	\$450/ Acre	\$ 40	\$183
2	\$250/ Acre \$40/ Ton x 1.6 Tons = \$64 \$314	-\$ 96	\$ 47
3	\$150/ Acre \$50/ Ton x 4.1 Tons = \$205 \$355	-\$ 55	\$ 88
Tons/ Year Receipts/ Year	1.9 Tons \$373	-\$ 37	\$106

## Annual Production Costs for Years 4 Thru 7 for Switchgrass Already Established as Part of the Biofuels Initiative Based on a 7 Ton Yield at 18% Moisture



\*Does not include a charge for land, management and risks.



\*Does not include a charge for land, management and risks.