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Northwestern Nevada Switchgrass Establishment, Production Costs and Returns, 2008

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INTRODUCTION

Sample costs and returns to establish and produce switchgrass under flood irrigation in Northwestern Nevada are presented in this publication. This publication is intended to be a guide used to make production decisions, determine potential returns, and prepare business and marketing plans. Practices described are based on the production practices considered typical for this crop and region, but may not apply to every situation. The “*Your Farm*” column in Tables 1 & 2 is provided for your use.

ASSUMPTIONS

The following assumptions refer to Tables 1 through 4 and reflect the typical costs and returns to establish and produce switchgrass stands under flood irrigation in Northwestern Nevada. The practices described are not the recommendations of the University of Nevada, Reno, but rather the production practices and materials considered typical of a well-managed farm in the region as determined by current studies and available literature. Costs, materials and practices are not applicable to all situations because establishment

and cultural practices vary among growers within the region.

Farm. The representative farm consists of 202 acres of land, of which 200 acres are cultivated for switchgrass production and 2 acres are used for owner housing, machine shop and roads. During the growing season the enterprise will produce two cuttings, with total production at 6 tons per acre. The minimum land market value in 2008 was approximately \$11,500.00 per acre for agricultural land in northwestern Nevada with water rights.

Stand Establishment

An establishment year is necessary before switchgrass can be harvested. The establishment year follows years of alfalfa production and consists of 18 months. The switchgrass stand life in Northwestern Nevada is ten years. Establishment year costs are provided in Table 1.

Land Preparation. In May, the field is mowed with a brush hog to remove most of the previous crop. Roundup* is applied to kill any remaining residue from the previous crop. The field is then disked with a heavy offset disk and harrowed. This is completed by custom hire at \$70.00/acre.

Planting. In June of the establishment year, switchgrass seed is drilled at 5 pounds per acre and is then firmed into the soil using a culti-packer. Seeding is completed by custom hire at \$16.00/acre.

Fertilization. No fertilizer is applied prior to planting. Commercial fertilizer (46-0-0* at \$64.00/acre) is applied by broadcast spreader in May.

Irrigation. Irrigation begins immediately after planting to establish the switchgrass seedlings prior to winter. Thirty-six inches of water are applied to fields via flood irrigation.

Pest Management. Insecticide and herbicide are not likely to be used during the establishment year. Weed control is obtained by one mowing to

a height of 10 inches during the first season. 2-4-D* is applied as an additional weed control.



Harvest. Switchgrass should not be harvested in the establishment year.

Establishment Investment. The switchgrass establishment investment cost is placed into the investment summary (Table 3) and is depreciated across the remaining 9-year stand life.

Production Cultural Practices and Material Inputs

Irrigation. Irrigation begins in March and continues through the last cutting, usually in early September. Irrigation costs shown in Tables 1 and 2 cover the per acre cost of water at \$25.00 per acre foot, plus an administration fee of \$50.00 per land parcel, which is assumed to be one parcel per every 50 acres, or four for the 200 acre farm. Also included are maintenance costs on ditches, such as hauling dirt to fix wash-outs, broken head gates and machinery costs to weed the ditches are \$10.00 per acre, or \$2000.00 annually. Total irrigation costs are \$86.00 per acre.

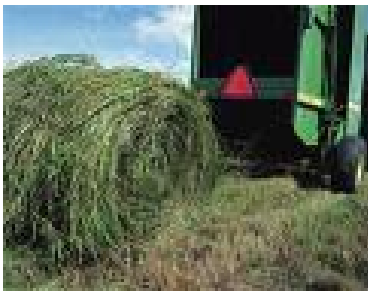
Fertilization. Commercial fertilizer (46-0-0* at \$64.00/acre) is applied by broadcast spreader in May .

Pest Management. No pest management methods are used with switchgrass due to the lack of insect pests.

Weeds. No herbicides are applied after the establishment years.



Harvest. Harvest occurs in July and September, and consists of swathing, raking, baling, and pickup baling, all of which is usually contracted out at a combined cost of \$120.00 per acre.



Labor. The owner/operator wage is based on an allowance to the owner/operator of \$75.00 per acre.

Utilities. Current utilities rates calculated using information from <http://econdev.nvadapower.com/sppc/county/lyon/utilities.htm> and http://www.swgas.com/tariffs/nvtariff/rates/rates_nnv.pdf Base utility costs of \$350 per month for the household were combined with costs of \$7 per acre per year to allow for utilities for outbuildings and shops.

Yield. The 200 acre farm yields 6 tons of switchgrass hay per acre across two annual cuttings.

Returns. Returns are based on available literature regarding willingness to pay by ethanol producers. An estimated price of \$66.00 per ton of switchgrass was used to calculate returns. Returns will vary during the growing season due to market conditions. Also included in returns are government payments of \$60.00 per acre because subsidies for ethanol production are a possibility as the price of oil increases. Conservation Reserve Program land may be able to grow switchgrass for biofuel and still preserve the environmental mandate of those programs, according to the Energy Information Administration.

Overhead and Capital Recovery Costs

Cash Overhead. Cash overhead consists of various cash expenses paid out during the year. These costs include property taxes, interest, office expenses, liability and property insurance, as well as investment/machinery repairs. A complete listing of farm investments and associated costs can be found in Table 3.

Interest on Operating Capital. Total operating capital is calculated based on 80 percent of total operating (variable) costs. The interest on operating capital is calculated at a rate of 6.5 percent for the six month production cycle.

Property Taxes. Property taxes in Nevada differ across counties. For the purposes of this publication, investment property taxes are calculated at 1 percent of the average asset value of the property.

Insurance. Insurance on farm investments vary, depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss at .666 percent of the average asset value. Liability insurance covers accidents on the farm at an annual cost of \$1,749.00. Insurance information provided by Kevin Ogan of Beauchamp & McSpadden, Inc.

Fuel and Lube. The fuel and lube for each piece of equipment is calculated at 8 percent of the purchase price. Fuel and lube in the

establishment year is 125 percent of that in a normal production year due to increased machinery use.

Investment Repairs. Annual repairs on all farm investments or capital recovery items that require maintenance are calculated at 2 percent of the purchase price for buildings, improvements and equipment and 7 percent of the purchase price for machinery and vehicles.

Office & Travel. Office and travel costs are estimated at \$3,000.00 for an average year. These expenses include office supplies, telephone service, Internet service, and travel expenses to educational seminars.

Capital Recovery. Capital recovery costs are the annual depreciation (opportunity cost) of all farm investments. Capital recovery costs are calculated using straight line depreciation. Farm equipment for this budget is based on the prices of new equipment.

Salvage Value. Salvage value is 10 percent of the new purchase price, which is an estimate of the remaining value of an investment at the end of its useful life. The salvage value for land is the purchase price as land does not normally depreciate.

Average Asset Value Computation

$$\left(\frac{\text{Purchase Price} + \text{Salvage Value}}{2}\right)$$

Straight Line Depreciation Computation

$$\left(\frac{\text{Purchase Price} - \text{Salvage Value}}{\text{Useful Life}}\right)$$

*The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by Cooperative Extension is implied.

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NOTES

Sample production costs and returns publications for significant agricultural products in various regions of Nevada are available online at the University of Nevada Cooperative Extension Web site at <http://www.unce.unr.edu/pubs.html>. For additional information, contact the Department of Resource Economics at the University of Nevada, Reno at (775) 784-6701 or your local University of Nevada Cooperative Extension office.

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Table 1: Northwestern Nevada Switchgrass Establishment Costs, 200 acres, 2008

	Total Units	Unit	Price/Cost Per Unit	Total Cost/Value	Total Cost/Value Per Acre	Your Farm
OPERATING COSTS						
Rodent Control	200.00	Acre	\$ -	\$ -	\$ -	_____
Insecticide	200.00	Acre	\$ -	\$ -	\$ -	_____
Herbicide	200.00	Acre	\$ 17.00	\$ 3,400.00	\$ 17.00	_____
Fertilizer	200.00	Acre	\$ 64.00	\$ 12,800.00	\$ 64.00	_____
Irrigation	200.00	Acre	\$ 86.00	\$ 17,200.00	\$ 86.00	_____
Seed	5.00	Lbs/Acre	\$ 8.00	\$ 8,000.00	\$ 40.00	_____
Roundup	2.00	Quarts/Acre	\$ 14.50	\$ 5,800.00	\$ 29.00	_____
Custom Land Prep	200.00	Acre	\$ 70.00	\$ 14,000.00	\$ 70.00	_____
Custom Drilling/Seeding	200.00	Acre	\$ 16.00	\$ 3,200.00	\$ 16.00	_____
Operator Labor	200.00	Acre	\$ 75.00	\$ 15,000.00	\$ 75.00	_____
Accounting & Legal	1.00	Annual	\$ 2,000.00	\$ 2,000.00	\$ 10.00	_____
Fuel & Lube	1.25	Annual	\$ 6,799.92	\$ 8,499.90	\$ 42.50	_____
Maintenance	1.00	Annual	\$ 12,339.47	\$ 12,339.47	\$ 61.70	_____
Utilities	1.00	Annual	\$ 5,600.00	\$ 5,600.00	\$ 28.00	_____
Miscellaneous	200.00	Acre	\$ 1.00	\$ 200.00	\$ 1.00	_____
Interest Operating Capital	\$ 86,431.50	\$	\$ 0.065	\$ 2,809.02	\$ 14.05	_____
TOTAL OPERATING COSTS				\$ 110,848.39	\$ 554.24	
OWNERSHIP COSTS						
CASH OVERHEAD COSTS						
Liability Insurance				\$ 1,749.00	\$ 8.75	_____
Office & Travel				\$ 3,000.00	\$ 15.00	_____
Annual Investment Insurance				\$ 2,081.00	\$ 10.40	_____
Annual Investment Taxes				\$ 26,354.62	\$ 131.77	_____
TOTAL CASH OVERHEAD COSTS				\$ 33,184.61	\$ 165.92	
NONCASH OVERHEAD COSTS (Capital Recovery)						
Buildings, Improvements, & Equipment				\$ 4,864.62	\$ 24.32	_____
Machinery & Vehicles				\$ 8,924.94	\$ 44.62	_____
TOTAL NONCASH OVERHEAD COSTS				\$ 13,789.56	\$ 68.95	
TOTAL OWNERSHIP COSTS				\$ 46,974.17	\$ 234.87	
TOTAL COSTS				\$ 157,822.57	\$ 789.11	
YEAR ONE INCOME						
Government Payments				\$ 78,911.28	\$ 394.56	_____
TOTAL GROSS INCOME				\$ 78,911.28	\$ 394.56	
TOTAL ESTABLISHMENT INVESTMENT				\$ 78,911.28	\$ 394.56	

Table 2: Northwestern Nevada Switchgrass Production Costs and Returns, 200 acres, 2008

	Total Units	Unit	Price/Cost Per Unit	Total Cost/Value	Total Cost/Value Per Acre	Your Farm
GROSS INCOME						
Switchgrass	6.00	Tons	\$ 66.00	\$ 79,200.00	\$ 396.00	_____
Government Payments	1.00	Annual	\$ 12,000.00	\$ 12,000.00	\$ 60.00	_____
TOTAL GROSS INCOME				\$ 91,200.00	\$ 456.00	
OPERATING COSTS						
Rodent Control	200.00	Acre	\$ -	\$ -	\$ -	_____
Insecticide	200.00	Acre	\$ -	\$ -	\$ -	_____
Herbicide	200.00	Acre	\$ -	\$ -	\$ -	_____
Fertilizer	200.00	Acre	\$ 64.00	\$ 12,800.00	\$ 64.00	_____
Irrigation	200.00	Acre	\$ 86.00	\$ 17,200.00	\$ 86.00	_____
Custom Swathing	200.00	Acre	\$ 30.00	\$ 6,000.00	\$ 30.00	_____
Custom Rake	200.00	Acre	\$ 10.00	\$ 2,000.00	\$ 10.00	_____
Custom Baling	200.00	Acre	\$ 85.00	\$ 17,000.00	\$ 85.00	_____
Custom Pickup Baling	200.00	Acre	\$ 45.00	\$ 9,000.00	\$ 45.00	_____
Operator Labor	200.00	Acre	\$ 75.00	\$ 15,000.00	\$ 75.00	_____
Accounting & Legal	1.00	Annual	\$ 2,000.00	\$ 2,000.00	\$ 10.00	_____
Fuel & Lube	1.00	Annual	\$ 6,799.92	\$ 6,799.92	\$ 34.00	_____
Maintenance	1.00	Annual	\$ 12,339.47	\$ 12,339.47	\$ 61.70	_____
Utilities	1.00	Annual	\$ 5,600.00	\$ 5,600.00	\$ 28.00	_____
Miscellaneous	200.00	Acre	\$ 1.00	\$ 200.00	\$ 1.00	_____
Operating Capital Interest	\$ 84,751.51	\$	\$ 0.065	\$ 2,754.42	\$ 13.77	_____
TOTAL OPERATING COSTS				\$ 108,693.81	\$ 543.47	
INCOME ABOVE OPERATING COSTS				\$ (17,493.81)	\$ (87.47)	
OWNERSHIP COSTS						
CASH OVERHEAD COSTS						
Liability Insurance				\$ 1,749.00	\$ 8.75	_____
Office & Travel				\$ 3,000.00	\$ 15.00	_____
Annual Investment Insurance				\$ 2,081.00	\$ 10.40	_____
Annual Investment Taxes				\$ 26,354.62	\$ 131.77	_____
TOTAL CASH OVERHEAD COSTS				\$ 33,184.61	\$ 165.92	
NONCASH OVERHEAD COSTS (Capital Recovery)						
Buildings, Improvements, & Equipment				\$ 12,755.75	\$ 63.78	_____
Machinery & Vehicles				\$ 8,924.94	\$ 44.62	_____
TOTAL NONCASH OVERHEAD COSTS				\$ 21,680.69	\$ 108.40	
TOTAL OWNERSHIP COSTS				\$ 54,865.30	\$ 274.33	
TOTAL COSTS				\$ 163,559.12	\$ 817.80	
NET PROJECTED RETURNS				\$ (72,359.12)	\$ (361.80)	

Table 3: Investment Summary

Description	Purchase Price	Useful Life (Yrs)	Salvage Value	Annual Capital Recovery	Annual Insurance	Annual Taxes	Annual Repairs	Annual Fuel & Lube
Buildings, Improvements, and Equipment								
Owner House	\$ 200,000.00	50.00	\$ 200,000.00	\$ -	\$ 1,332.00	\$ 2,000.00	\$ 4,000.00	
Land	\$ 2,323,000.00	150.00	\$ 2,323,000.00	\$ -	\$ -	\$ 23,230.00	\$ -	
Shop (30X40) & Tools	\$ 41,000.00	25.00	\$ 4,100.00	\$ 1,476.00	\$ 150.18	\$ 225.50	\$ 820.00	
Metal Equipment Shed (40x60)	\$ 55,000.00	25.00	\$ 5,500.00	\$ 1,980.00	\$ 201.47	\$ 302.50	\$ 1,100.00	
Implements	\$ 23,477.00	15.00	\$ 2,347.70	\$ 1,408.62	\$ 86.00	\$ 129.12	\$ 469.54	
Switchgrass Establishment	\$ 78,911.28	10.00	\$ -	\$ 7,891.13	\$ -	\$ -	\$ -	
Sub Total Pre-Establishment	\$ 2,642,477.00	NA	\$ 2,534,947.70	\$ 4,864.62	\$ 1,769.64	\$ 25,887.12	\$ 6,389.54	
Sub Total Post-Establishment	\$ 2,721,388.28	NA	\$ 2,534,947.70	\$ 12,755.75	\$ 1,769.64	\$ 25,887.12	\$ 6,389.54	
Machinery and Vehicles								
74 HP Tractor w/ loader	\$ 24,999.00	15.00	\$ 2,499.90	\$ 1,499.94	\$ 91.57	\$ 137.49	\$ 1,749.93	\$ 1,999.92
4-Wheeler	\$ 10,000.00	5.00	\$ 1,000.00	\$ 1,800.00	\$ 36.63	\$ 55.00	\$ 700.00	\$ 800.00
1 Ton Pickup	\$ 50,000.00	8.00	\$ 5,000.00	\$ 5,625.00	\$ 183.15	\$ 275.00	\$ 3,500.00	\$ 4,000.00
Sub Total	\$ 84,999.00	NA	\$ 8,499.90	\$ 8,924.94	\$ 311.35	\$ 467.49	\$ 5,949.93	\$ 6,799.92
Total	\$ 2,806,387.28	NA	\$ 2,543,447.60	\$ 21,680.69	\$ 2,081.00	\$ 26,354.62	\$ 12,339.47	\$ 6,799.92

Table 4: Monthly Cash Flow

Description	January	February	March	April	May	June	July	August	September	October	November	December	Total
Production:													
Switchgrass	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 39,600.00	\$ -	\$ 39,600.00	\$ -	\$ -	\$ -	\$ 79,200.00
Government Payments	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12,000.00	\$ -	\$ 12,000.00
	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Income	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 39,600.00	\$ -	\$ 39,600.00	\$ -	\$ 12,000.00	\$ -	\$ 91,200.00
Operating Inputs:													
Rodent Control	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Insecticide	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Herbicide	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fertilizer	\$ -	\$ -	\$ 12,800.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12,800.00
Irrigation	\$ -	\$ -	\$ 2,457.14	\$ 2,457.14	\$ 2,457.14	\$ 2,457.14	\$ 2,457.14	\$ 2,457.14	\$ 2,457.14	\$ -	\$ -	\$ -	\$ 17,200.00
Custom Swathing	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,000.00	\$ -	\$ -	\$ -	\$ 6,000.00
Custom Rake	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,000.00	\$ -	\$ -	\$ -	\$ 2,000.00
Custom Baling	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 17,000.00	\$ -	\$ -	\$ -	\$ 17,000.00
Custom Pickup Baling	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000.00	\$ -	\$ -	\$ -	\$ 9,000.00
Operator Labor	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 15,000.00
Accounting & Legal	\$ 166.67	\$ 166.67	\$ 166.67	\$ 166.67	\$ 166.67	\$ 166.67	\$ 166.67	\$ 166.67	\$ 166.67	\$ 166.67	\$ 166.67	\$ 166.67	\$ 2,000.00
Fuel & Lube	\$ 357.89	\$ 357.89	\$ 715.78	\$ 715.78	\$ 715.78	\$ 715.78	\$ 715.78	\$ 715.78	\$ 715.78	\$ 357.89	\$ 357.89	\$ 357.89	\$ 6,799.92
Maintenance	\$ 649.45	\$ 649.45	\$ 1,298.89	\$ 1,298.89	\$ 1,298.89	\$ 1,298.89	\$ 1,298.89	\$ 1,298.89	\$ 1,298.89	\$ 649.45	\$ 649.45	\$ 649.45	\$ 12,339.47
Utilities	\$ 466.67	\$ 466.67	\$ 466.67	\$ 466.67	\$ 466.67	\$ 466.67	\$ 466.67	\$ 466.67	\$ 466.67	\$ 466.67	\$ 466.67	\$ 466.67	\$ 5,600.00
Miscellaneous	\$ 16.67	\$ 16.67	\$ 16.67	\$ 16.67	\$ 16.67	\$ 16.67	\$ 16.67	\$ 16.67	\$ 16.67	\$ 16.67	\$ 16.67	\$ 16.67	\$ 200.00
Interest OC	\$ 229.54	\$ 229.54	\$ 229.54	\$ 229.54	\$ 229.54	\$ 229.54	\$ 229.54	\$ 229.54	\$ 229.54	\$ 229.54	\$ 229.54	\$ 229.54	\$ 2,754.42
Total Operating Costs	\$ 3,136.87	\$ 3,136.87	\$ 19,401.35	\$ 6,601.35	\$ 6,601.35	\$ 6,601.35	\$ 6,601.35	\$ 6,601.35	\$ 40,601.35	\$ 3,136.87	\$ 3,136.87	\$ 3,136.87	\$ 108,693.81
Net Returns	\$ (3,136.87)	\$ (3,136.87)	\$ (19,401.35)	\$ (6,601.35)	\$ (6,601.35)	\$ (6,601.35)	\$ 32,998.65	\$ (6,601.35)	\$ (1,001.35)	\$ (3,136.87)	\$ 8,863.13	\$ (3,136.87)	\$ (17,493.81)

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