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The Economics of Grass-Fed Beef

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Badgerland Financial

- Rural lending (& other financial services) cooperative
- Farm Credit System association
- 350 employees, 17 offices, 33 counties in Southern Wisconsin
- 16,000 members
- Largest ag lender in Wisconsin
- Paid \$13.5 million in cash dividends this year to farmers/members as distribution of 2015 profits



We can use enterprise budgets to do a feasibility analysis





Simple enterprise budget

Expected Gross Revenue (per acre, per head, per marketing outlet)

- Variable costs
 - Overhead costs
- = Net return



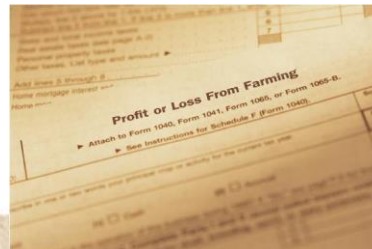
Breaking out costs

- **Variable Costs**

- Costs that increase as farm production increases
- Includes cost of feeder livestock, seed, feed, fertilizer, vet expenses, utilities, trucking, marketing, interest on operating loans, hired labor

- **Overhead Costs**

- Costs that exist on the farm whether or not anything is being produced
- Can include depreciation, interest, repairs, property taxes, insurance, value of owner's labor, return on \$\$ invested





Conventional Corn Enterprise Budget - 2016

190 bushels x \$3.00/bushel		\$570
ARC/PLC payment		<u>\$25</u>
		\$595
Seed	\$125	
Fertilizer	\$150	
Chemicals/spraying	\$40	
Tillage	\$50	
Planting	\$18	
Harvesting	\$32	
Hauling/drying	\$30	
Crop ins.	\$30	
Operating interest	<u>\$10</u>	
	\$485	-\$485
Land charge	\$200	<u>-\$200</u>
		(\$90)

For simplicity, this budget assumes all field operations are being custom hired



Conventional Soybean Budget - 2016

50 bushels x \$9.00/bushel		\$450
ARC/PLC payment		<u>\$25</u>
		\$475
Seed	\$75	
Fertilizer	\$30	
Chemicals/spraying	\$30	
Tillage	\$50	
Planting	\$18	
Harvesting	\$32	
Hauling/drying	\$10	
Crop ins.	\$20	
Operating interest	<u>\$5</u>	
	\$270	-\$270
Land charge	\$200	<u>-\$200</u>
		\$5

For simplicity, this budget assumes all field operations are being custom hired



Enterprise budgeting

- Variable costs are relatively easy
- Overhead costs are tougher. We need to annualize and allocate the costs of capital investments (*“economic depreciation”*)
 - Perimeter fence
 - Pasture establishment
 - Energizer
 - Interior fencing
 - Watering system
 - Machinery & vehicles





Pasture budget

Estimated useful life of capital investments

- | | |
|-------------------------|----------|
| – Perimeter fence | 20 years |
| – Pasture establishment | 5 years |
| – Energizer | 5 years |
| – Interior fencing | 5 years |
| – Watering system | 15 years |
| – Machinery & vehicles | 7 years |

Total capital investment: **\$14,150** (\$353.75/ac)

1320'

40-acre pasture

Perimeter fence: $\$9,600 \div 40 \text{ ac} \div 20 \text{ years} = \$12/\text{ac}$

Pasture establishment: $\$1,800 \div 40 \div 5 \text{ years} = \$9/\text{ac}$

Energizer: $\$400 \div 40 \div 5 \text{ years} = \$2/\text{ac}$

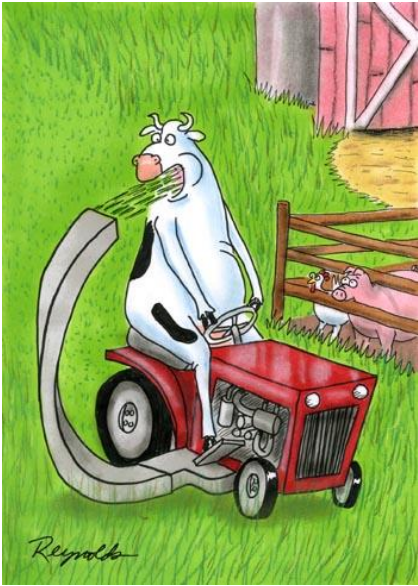
Interior fencing: $\$350 \div 40 \div 5 \text{ years} = \$1.75/\text{ac}$

Watering system: $\$2,000 \div 40 \div 15 \text{ years} = \$3.33/\text{ac}$

Total economic depreciation = \$28.08/acre/year

1320'





Yeah, that's sort of interesting, but what happens when we bring livestock into the equation?

Stocker budget (per head)

Stocker 800# x \$1.25	\$1,000	\$1,000
Cost of feeder 500# x \$1.45	\$725	
Vet & medicine	\$8	
Supplies	\$8	
Electricity	\$10	
Hauling & marketing	\$12	
Death loss 1% x \$1,200	\$10	
Labor	\$45	
Operating interest	<u>\$20</u>	
	\$838	-\$838
Land charge	\$60	
Economic depreciation	\$28.08	
Return on cap investment	\$18	
Return on management	<u>\$30</u>	
	\$136	-\$136
Return per head		\$26
Return per acre		\$26

Breakeven to cover
variable costs
 $\$838/800\# = \$1.05/\text{lb}$

Breakeven to cover ALL
costs
 $\$974/800\# = \$1.22/\text{lb}$

**\$26 per acre doesn't seem like
enough return given the risks involved.**



**What if we bought yearling steers, finished
them on grass, & sold them direct to
consumers?**

Grass finished steer budget (per head)

Finished steer (667# hanging wt @ \$3)	\$2,000	\$2,000
Cost of yearling 800# x \$1.25	\$1,000	
Vet & medicine	\$8	
Supplies	\$10	
Electricity	\$15	
Hauling & marketing	\$200	
Death loss 1% x \$2,000	\$20	
Labor	\$45	
Operating interest	<u>\$30</u>	
	\$1,328	
Land charge	\$90	
Economic depreciation	\$42.12	
Return on equity investment	\$27	
Return on management	<u>\$45</u>	
	\$204	
Return per head		\$468
Return per acre (1 steer per 1.5 acres)		\$312

$-\$1,328$
 Breakeven to cover
 variable costs
 $\$1328/667\# = \$1.99/lb$

Breakeven to cover ALL
 costs
 $\$1532/667\# = \$2.30/lb$

This budget assumes customer pays for kill, cut and wrap



Okay, so a grazing operation is economically feasible but...

Is it a good investment of our capital?

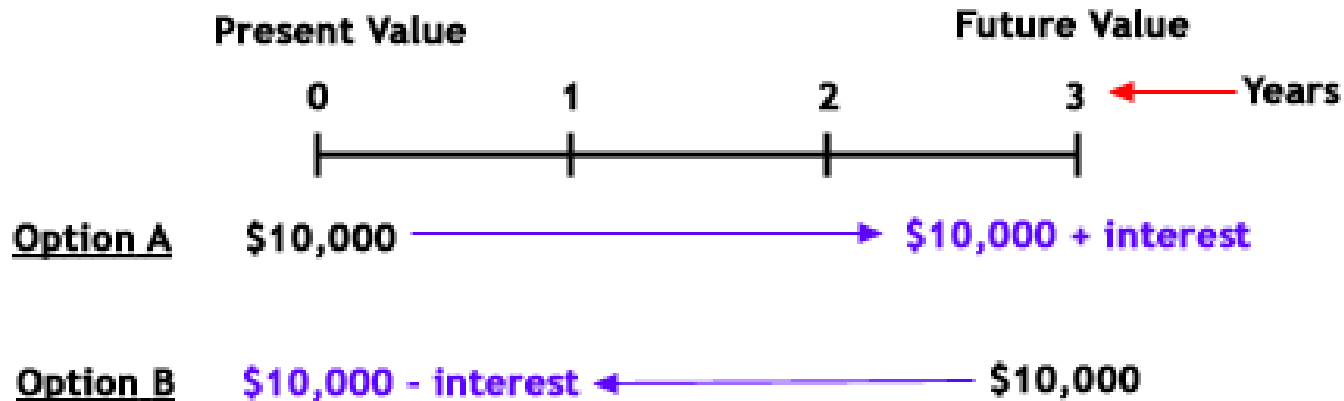




Time Value of Money

- Money has a time value
 - The sooner you receive money, the better
 - Money you get today can be invested or used to stop interest from accruing
 - Inflation causes money to lose buying power over time
- Benefit of investments are in the future
 - We need to adjust values for the cost of waiting
 - The longer you have to wait, the more you should receive
 - The longer you wait, the greater the risk that you won't get paid back





In Option A, we are “compounding” our initial investment so we apply a “compound interest rate”

In Option B, we are “discounting” our future cash payment so we apply a “discount rate”



Net Present Value (NPV)

- Tells us what a future cash payment is worth in today's dollars
- Converts a stream of future cash flows into a single current value
- Can tell us if an opportunity is a good investment
- It won't tell us if it's the best investment



Scenario: You are thinking about buying a log splitter for \$1,500

You've done a simple cash flow projection and calculate that after paying the fuel and maintenance costs, you can net an additional \$200 worth of firewood each year with the same amount of labor it takes to split wood by hand. You can also rent it out for a few days to a neighbor and generate another \$100. Total annual cash flow: \$300.

You plan to use the splitter for five seasons, then believe you could still sell it for \$1,000.



It is tempting to do this really simple calculation:

Five years x \$300/year =	\$1,500
Salvage value	<u>\$1,000</u>
	\$2,500
Minus the initial cost	<u>-\$1,500</u>
=Net cash flow for 5 years	\$1,000

This suggests you'd get a 67% return on your initial investment

(\$1,000/\$1,500 = 67%), which is **NOT TRUE**.

This calculation doesn't consider the time value of money. To factor in the cost of waiting for the cash flow, we need to apply a ***discount rate***.



How do we establish a “discount rate?”

- We could use the interest rate we would have to pay to get a loan for the capital purchase
- We could use the prime lending rate and add to it the rate of inflation
- We could establish a personal “hurdle rate”
- Whichever method we use, we need to adjust for the riskiness of the investment. The more risky it is, the greater the discount factor.



NPV of cash flows for log splitter

Year	Annual Net Cash Flow	Discount Factor @ 5%	Present Value of Annual Net Cash Flow
1	\$300	.9523	\$285.69
2	\$300	.9070	\$272.10
3	\$300	.8638	\$259.14
4	\$300	.8227	\$246.81
5	\$300 + \$1,000	.7835	\$1018.55
	Net Present Value of the cash flows		\$2,082.29

Since the initial cash outlay for the log splitter was \$1,500, it makes sense to make the investment. But, if the return isn't 67%, how much is it???



Better than 5%, less than 67%, but how good is the investment opportunity?

An Internal Rate of Return calculation simply tries different discount rates until we find the one at which the Net Present Value of our expected cash flows is equal to the initial investment.





How good is the investment in the log splitter?

Term in years	Expenses			Income				Cash flows
	Fixed costs	Other costs	Total	Money saved by project	Annual net cash flow	Equipment sales	Total	
0	\$1,500	\$0	\$1,500	\$0	\$0	\$0	\$0	\$1,500
1	0	0	0	0	300		300	300
2	0	0	0	0	300		300	300
3	0	0	0	0	300		300	300
4	0	0	0	0	300		300	300
5	0	0	0	0	300	1,000	1,300	1,300
6	0	0	0	0	0	0	0	0
7			0		0	0	0	0
8			0				0	0
9			0				0	0
10			0				0	0
				Net Cash Flow =				\$1,000.00
				IRR =				15.06%

(You can download this free Internal Rate of Return calculator in Excel from Microsoft's website)



Scenario: You want to buy 40 acres of land to set up your grassfed beef enterprise. Cost of the land is \$160,000. You'll put \$48,000 down and finance \$112,000 over 20 years at 5% interest. You'll pay cash for the improvements, \$14,150. Total cash outlay: \$62,150.

You expect the land to increase in value 3% per year. At the end of five years, land will be worth approximately \$185,000. Remaining principal balance on the loan at that point: \$93,284. Remaining value of the improvements: \$8,500. Total equity at end of five years: \$100,216 (land equity \$91,716 + \$8,500 = \$100,216).



First step: annual cash flow projection

Income: 27 steers/yr @ \$2,000 = \$54,000

Expenses:

Operating: \$1328 x 27 head = \$35,856

Loan payment: \$8,987/year = \$8,987

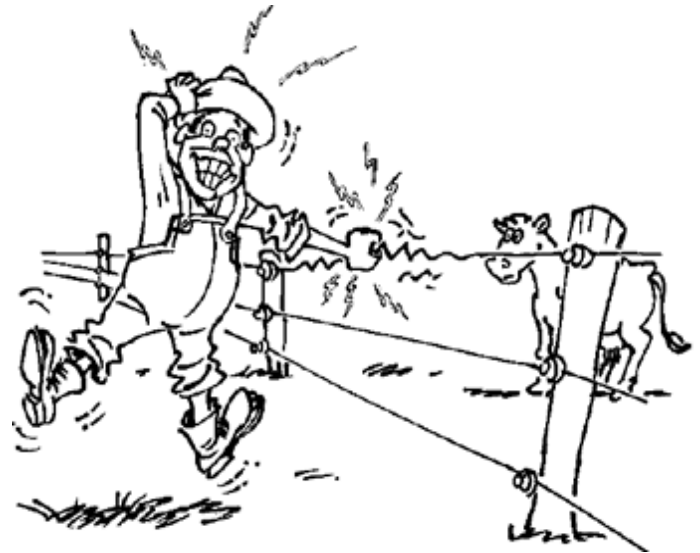
Property taxes: \$2 x 40 = \$80

Total cash expenses \$44,923 -\$44,923

Net annual cash flow \$9,077



Next: We'll calculate the Net Present Value of the cash flows, and the Internal Rate of Return on the capital investment





NPV for 40-acre pasture purchase

Year	Annual Net Cash Flow	Discount Factor @ 5%	Present Value of Annual Net Cash Flow
1	\$9077	.9523	\$8644
2	\$9077	.9070	\$8233
3	\$9077	.8638	\$7841
4	\$9077	.8227	\$7468
5	\$9077+ \$100216 = \$109,293	.7835	\$85631
	Net Present Value of the cash flows		\$117,817

Since the initial cash outlay was \$62,150, this is a good investment; better than a 5% rate of return on the cash investment.



How good is the investment?

Term in years	Expenses			Income				Cash flows
	Fixed costs	Other costs	Total	Money saved by project	Annual net cash flow	Remaining equity	Total	
0	\$62,150	\$0	\$62,150	\$0		\$0	\$0	\$62,150
1					\$9,077		9,077	9,077
2					\$9,077		9,077	9,077
3					\$9,077		9,077	9,077
4					\$9,077		9,077	9,077
5					\$9,077	100,216	109,293	109,293
6							0	0
7							0	0
8							0	0
9							0	0
10							0	0
					Net Cash Flow =			\$83,451.00
							IRR =	22.45%

What if we own land that could be grazed and we just want to rent it out? Or, what if we just want to rent pasture?



We can calculate the IRR if we know:

- 1) the upfront capital investment required**
- 2) the estimated annual cash flows**
- 3) residual value at the end of the investment term**

Scenario: You own 40 acres of open, rolling land that is not currently generating any income. Property taxes as undeveloped land are \$1,800/year. A beef producer wants to enter into a five-year lease to use it as pasture. Your property taxes will drop to \$80/year as pasture.

It will cost \$14,150 to build perimeter fence, watering system, etc. You could pay 100% of the costs and charge an annual rental rate of \$75/acre or let the grazier make the improvements and charge \$50/acre. You'll pay the grazier \$5,000 at the end of the lease term for the improvements if you don't renew the lease.

Would either be a good deal? Which is better?

Option A: Landowner pays for pasture improvements

Cash outlay for 40 acres perimeter fence, energizer, watering system will be approximately \$14,150.

Annual income:

Extra pasture rent : \$25 x 40 acres	1,000	
Property tax savings	<u>1,720</u>	
	\$2,720	\$2,720

Annual costs:

Property taxes	\$80	<u>-\$80</u>
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Net annual cash flow \$2,640

At the end of five years, the pasture improvements will have depreciated to \$8,500.

Return to landowner if he/she makes the upfront investment: 12.42%

Term in years	Expenses			Income				Cash flows
	Fixed costs	Other costs	Total	Money saved by project	Annual net cash flow	Remaining equity	Total	
0	\$14,150	\$0	\$14,150	\$0		\$0	\$0	\$14,150
1					\$2,640		2,640	2,640
2					\$2,640		2,640	2,640
3					\$2,640		2,640	2,640
4					\$2,640		2,640	2,640
5					\$2,640	8,500	11,140	11,140
6							0	0
7							0	0
8							0	0
9							0	0
10							0	0
					Net Cash Flow =			\$7,550.00
							IRR =	12.42%

What if the improvements were cost-shared at 70%?

Term in years	Expenses			Income				Cash flows
	Fixed costs	Other costs	Total	Money saved by project	Annual net cash flow	Remaining Equity	Total	
0	\$4,245	\$0	\$4,245	\$0	\$0	\$0	\$0	\$4,245
1	0	0	0	0	2,640		2,640	2,640
2	0	0	0	0	2,640		2,640	2,640
3	0	0	0	0	2,640		2,640	2,640
4	0	0	0	0	2,640		2,640	2,640
5	0	0	0	0	2,640	8,500	11,140	11,140
6	0	0	0	0		0	0	0
7			0			0	0	0
8			0				0	0
9			0				0	0
10			0				0	0
					Net Cash Flow =			\$17,455.00
							IRR =	67.72%

What if landowner pays 100% of the cost and never leases the pasture again?

Term in years	Expenses			Income				Cash flows
	Fixed costs	Other costs	Total	Money saved by project	Annual net cash flow	Equipment sales	Total	
0	\$14,150	\$0	\$14,150	\$0	\$0	\$0	\$0	\$14,150
1	0	0	0	0	2,640		2,640	2,640
2	0	0	0	0	2,640		2,640	2,640
3	0	0	0	0	2,640		2,640	2,640
4	0	0	0	0	2,640		2,640	2,640
5	0	0	0	0	2,640		2,640	2,640
6	0	0	0	0		0	0	0
7			0			0	0	0
8			0				0	0
9			0				0	0
10			0				0	0
				Net Cash Flow =				\$950.00
				IRR =				-2.27%

What if landowner gets cost-sharing and never leases the pasture again?

Term in years	Expenses			Income				Cash flows
	Fixed costs	Other costs	Total	Money saved by project	Annual net cash flow	Remaining Equity	Total	
0	\$4,245	\$0	\$4,245	\$0	\$0	\$0	\$0	\$4,245
1	0	0	0	0	2,640		2,640	2,640
2	0	0	0	0	2,640		2,640	2,640
3	0	0	0	0	2,640		2,640	2,640
4	0	0	0	0	2,640		2,640	2,640
5	0	0	0	0	2,640	0	2,640	2,640
6	0	0	0	0		0	0	0
7			0			0	0	0
8			0				0	0
9			0				0	0
10			0				0	0
				Net Cash Flow =				\$8,955.00
							IRR =	55.31%

Option B: Grazier pays for pasture improvements; landowner pays later

Initial cash outlay for grazier is \$14,150.

Grazier expects net annual cash flow from livestock production to be \$4,000 (\$100/acre)

At the end of five years, landowner will pay grazier \$5,000 for remaining value of pasture improvements.

Return to grazier from investment in pasture improvements: 19.49%

Term in years	Expenses			Income				Cash flows
	Fixed costs	Other costs	Total	Money saved by project	Annual net cash flow	Payment for fence	Total	
0	\$14,150	\$0	\$14,150	\$0		\$0	\$0	\$14,150
1					\$4,000		4,000	4,000
2					\$4,000		4,000	4,000
3					\$4,000		4,000	4,000
4					\$4,000		4,000	4,000
5					\$4,000	5,000	9,000	9,000
6							0	0
7							0	0
8							0	0
9							0	0
10							0	0
				Net Cash Flow =				\$10,850.00
				IRR =				19.49%



What if the landowner didn't pay anything for the improvements at the end of the lease?

Term in years	Expenses			Income				Cash flows
	Fixed costs	Other costs	Total	Money saved by project	Annual net cash flow	Equipment sales	Total	
0	\$14,150	\$0	\$14,150	\$0	\$0	\$0	\$0	\$14,150
1	0	0	0	0	4,000	0	4,000	4,000
2	0	0	0	0	4,000	0	4,000	4,000
3	0	0	0	0	4,000	0	4,000	4,000
4	0	0	0	0	4,000	0	4,000	4,000
5	0	0	0	0	4,000	0	4,000	4,000
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
					Net Cash Flow =			\$5,850.00
							IRR =	12.76%



Some cautions

- This is only the beginning, not the whole story
- Don't substitute enterprise budgeting or investment analysis for whole farm financial planning and analysis
- Changing markets can cause huge shifts in net returns
- Only with several years of financial statements—balance sheets, income statements, statements of cash flow—can you do a valid analysis of financial strengths and vulnerabilities of a farm operation
- All of this is meaningless if an enterprise doesn't fit with your goals and the quality of life you want to achieve.

Thank You!

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