



Raising vs. Purchasing Replacement Heifers



Kevin C. Dhuyvetter
K-State Ag Economics
kcd@ksu.edu
785-532-3527



Managing the Cowherd
 Tuesday, November 9, 2010
 Southeast Kansas Stockyards
 3811 South Main
 Gatz, Kansas

Supper 5:30 p.m. - Program 6:00 p.m.
 Meal provided by Citicore Bank, SA - Ft. Scott & Dale

Permanently Infected Cattle, BVD Testing & Blood Pregnancy Diagnosis
 Dr. Don Corcoran, President, Genetic Services (GS) Genetics

Mixed-Race Supplementations
 Dr. Frank Briles, Extension Educator and Extension Animal Health Specialist

Raising vs. Purchasing Replacement Heifers
 Dr. Kevin Dhuyvetter, Extension Educator and Extension Ag Economist

Please RSVP by Friday, November 5th
 Southeast Extension District - Dale Office: 620-663-2242
 Southwest Extension District - Erie Office: 620-244-1826
 Boardman County Extension Office: 620-223-8720

KSTATE
 Kansas State University



First some background information on cow-calf returns



Cow-calf profitability drivers...

- Analysis of KFMA cow-calf enterprise analysis returns
 - 1979-2008 all operations (examine time effect)
 - 2004-2008 operations with at least three years of data (examine producer effect)
- Paper available on web (www.agmanager.info)

The following charts/table use the same procedure, only they have been updated to include 2009 data.

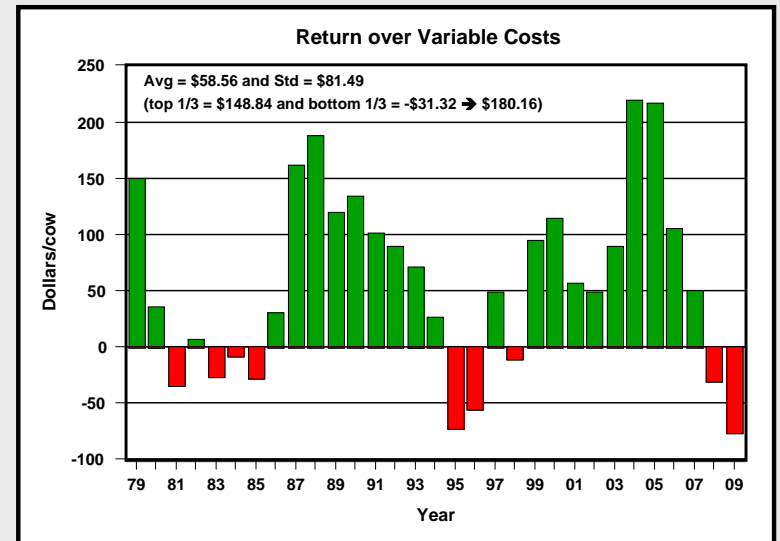
www.agmanager.info **AG MANAGER.INFO**

Differences Between High, Medium, and Low Profit Cow-Calf Producers:
 An Analysis of 2004-2008 Kansas Farm Management Association Cow-Calf Enterprise

Kevin Dhuyvetter and Michael Langemeier
 Department of Agricultural Economics, Kansas State University
 June 2009 - Revised January 2010



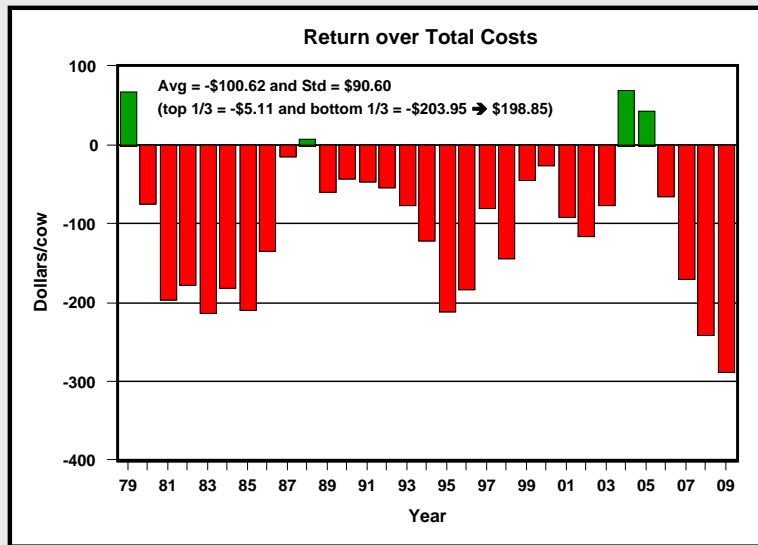
Average returns are highly variable over time...



Source: Kansas Farm Management Association (KFMA) Annual Enterprise Analysis Reports



Average returns are highly variable over time...



Source: Kansas Farm Management Association (KFMA) Annual Enterprise Analysis Reports



Returns are more variable across producers...

Beef Cow-calf Enterprise, 2005-2009 (min of 3 years)*

	All Farms	Profit Category			Difference between High 1/3 and Low 1/3	
		High 1/3 Head / \$	Mid 1/3 Head / \$	Low 1/3 Head / \$	Absolute	%
Number of Farms	73	24	25	24		
Labor allocated to livestock, %	37.4	50.1	30.8	31.5		
Number of Cows in Herd	137	194	127	92	102	112%
Number of Calves Sold	126	179	118	82	97	118%
Weight of Calves Sold	576	582	580	567	15	3%
Calf Sales Price / Cwt	\$108.00	\$108.44	\$108.24	\$107.32	\$1.12	1%
Gross Income	\$515.19	\$566.24	\$522.26	\$456.77	\$109.47	24%
Feed	\$321.39	\$279.22	\$322.23	\$362.69	30.6%	-\$83.47 -23%
Interest	\$112.94	\$94.66	\$112.09	\$132.11	-\$37.45	-28%
Vet Medicine / Drugs	\$16.32	\$16.26	\$15.63	\$17.11	-\$0.85	-5%
Livestock Marketing / Breeding	\$11.79	\$11.19	\$12.29	\$11.86	-\$0.66	-6%
Depreciation	\$30.91	\$25.56	\$24.88	\$42.53	-\$16.97	-40%
Machinery	\$66.52	\$50.32	\$65.02	\$84.27	-\$33.95	-40%
Labor	\$92.16	\$66.57	\$87.08	\$123.03	-\$56.46	-46%
Other	\$33.35	\$22.51	\$36.84	\$40.56	69.4%	-\$18.05 -45%
Total Cost	\$685.38	\$566.30	\$676.07	\$814.16	-\$247.86	-30%
Net Return to Management	-\$170.19	-\$0.06	-\$153.81	-\$357.39	\$357.33	

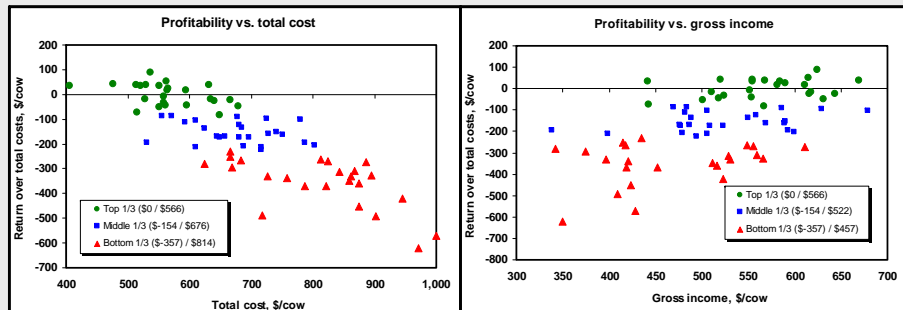
* Sorted by Net Return to Management (Returns over Total Costs) per Cow

Compared to \$180-\$200 between top and bottom third years.

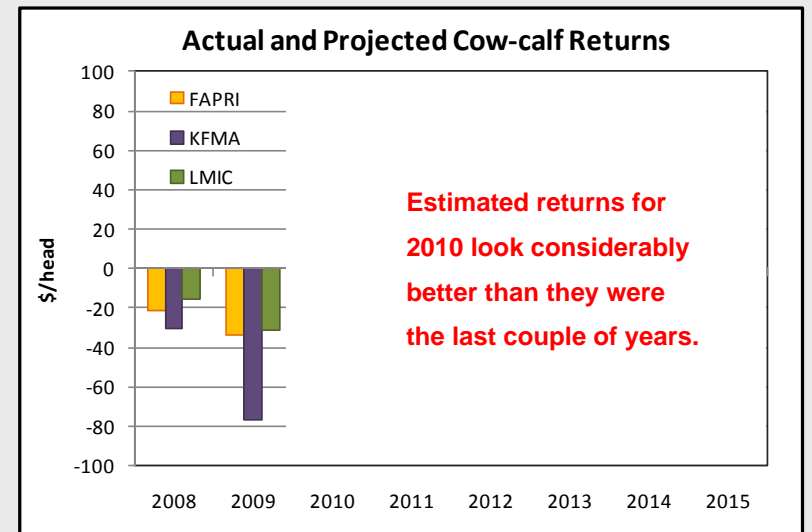


Cow-calf profitability drivers...

- Returns are more variable across producers at a point in time than they are on average over time (i.e., even in "hard times" some producers are profitable)
- Cost differences explain a much bigger portion of profitability differences across producers than does income differences

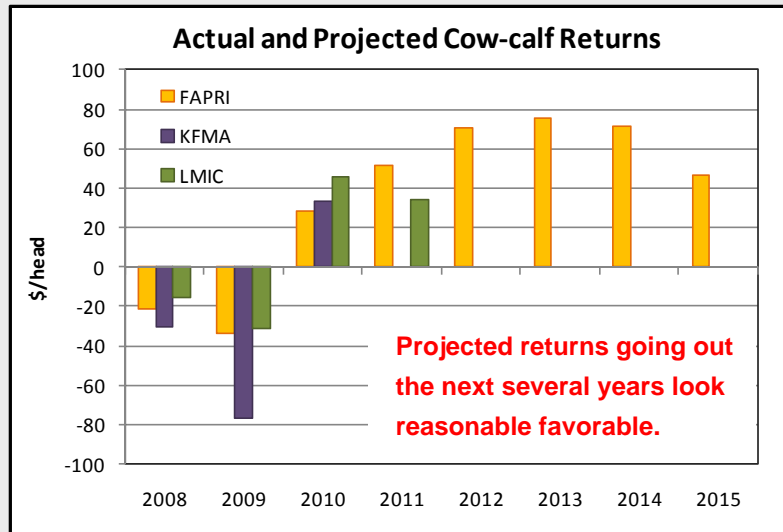


Looking back and ahead...





Looking back and ahead...



Managing the Cowherd

Buying versus raising replacement heifers

(cow-calf data/results likely apply to heifer development as well)



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What do most operators do?

Percent of heifers raised on operation?

Percent of cows raised on operation?

Source of Female Replacements		
Source	Percent Heifers	Percent Cows
Raised on the operation	83.0	75.6
Purchased	17.0	24.4

Source: USDA APHIS VS NAHMS Beef 2007-08

Part I: Reference of Beef Cow-calf Management Practices in the United States, 2007-08

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Why raise your own replacements?

1. Maintain/control genetic makeup of herd
2. Lower cost (perceived and/or actual)
3. Use/employ existing resources
4. Maintain flexibility in marketing heifer calves
5. Availability of heifers to purchase is limited
6. Control the "quality of heifer development"
7. Other (e.g., biosecurity, fewer uncertainties)...

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Why not raise your own replacements?

1. Improve genetics of herd by purchasing
2. Higher cost (especially true for smaller operations)
3. Lack necessary resources (labor, facilities)
4. Increased flexibility
5. Different sire desired for steers vs. heifers
6. Low/poor quality control of heifer development
7. Other (free up resources, i.e., run more cows)...

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Raising replacement heifers...

Bottom line -- you need to identify the strengths and weaknesses of your operation with regards to raising/developing replacement heifers.

That is, make sure you know if this a comparative advantage (or disadvantage) of your operation?

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Raising replacement heifers...

“Best advice on replacement heifers is to have a scale for the cattle and the feed.”

Sandy Johnson, PhD
Livestock Specialist
K-State Research & Extension

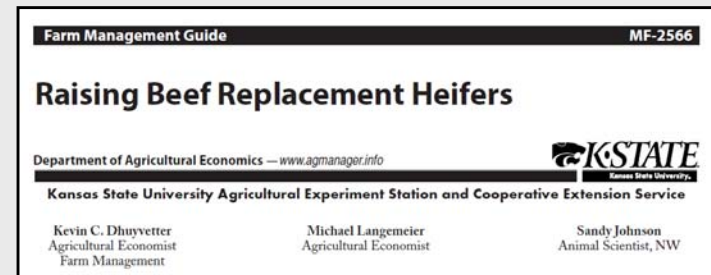


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Projected heifer replacement costs for 2011...

- Farm Management Guide for replacement heifers



- Developed annually in the fall/winter and based on cost and price assumptions and projections at that time.
- Useful “guide” as to what to possibly expect, but producers are encouraged to update/revise the numbers for their own situations.

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Budgets are available on agmanager.info

The screenshot shows the AgManager website interface. The navigation menu includes Home, Farm Management, FM Guides, and Livestock. The Livestock section is active, displaying a table of budgets categorized by Swine, Dairy, and Beef Cattle. The 'Raising Beef Replacement Heifers' budget (MF-2566) is highlighted with a red box.

Swine		
Title	Bulletin	PDF
Farrow-to-Finish Swine Cost-Return Budget	MF-292	Download
Farrow-to-Weaned Pig Cost-Return Budget	MF-2153	Download
Feeder Pig Nursery Cost-Return Budget	MF-2151	Download
Swine Finishing Cost-Return Budget	MF-2152	Download
Wean-to-Finish Cost-Return Budget	MF-2757	Download
Dairy		
Title	Bulletin	PDF
Dairy Enterprise: 100 Lactating Cows (Freestall)	MF-272	Download
Dairy Enterprise: 600 Lactating Cows (Freestall)	MF-2441	Download
Dairy Enterprise: 2400 Lactating Cows (Freestall)	MF-2442	Download
Dairy Enterprise: 2400 Lactating Cows (Drylot)	MF-2540	Download
Raising Dairy Herd Replacements	MF-399	Download
Beef Cattle		
Title	Bulletin	PDF
Beef Cow-Calf Enterprise	MF-266	Download / Excel
Raising Beef Replacement Heifers	MF-2566	Download / Excel
Beef Cattle Feed Requirements	MF-264	Download / Excel
Drylot Backgrounding of Beef	MF-600	Download / Excel
Drylot Backgrounding and Finishing Beef	MF-593	Download / Excel
Finishing Beef	MF-592	Download / Excel
Summer Grazing of Steers in Western Kansas	MF-1007	Download / Excel



Budget assumptions...

- Start with 550 lb weaned heifer in Oct (year 0)
- End with 1100 lb bred heifer in Mar (year 2)
- Need to account for heifers that fall out along the way (i.e., those that never make it into the cowherd)



Budget assumptions...

- Start with 550 lb weaned heifer in Oct (year 0)
- End with 1100 lb bred heifer in Mar (year 2)

Table 1. Factors Used for Raising Beef Replacement Heifers Cost-Return Budget

	10/15 to 5/1	5/1 to 10/15	10/15 to 3/1
Beginning weight	550	750	960
Ending weight	750	960	1,100
Days	198	167	137
Percent at beginning of period	100.0%	98.0%	86.0%
Percent sold at end of period	2.0%	12.0%	1.5%
Beginning value (550 lbs), \$/cwt		100.0%	\$108.48
Yearling heifer value prior to breeding season (750 lbs), \$/cwt		2.0%	\$105.12
Cull heifer value after breeding season (960 lbs), \$/cwt		12.0%	\$99.92
Cull heifer value at calving time (1,100 lbs), \$/cwt		1.5%	\$102.24
Spring heifer value, \$/head*		83.5%	\$1,334

* Percent sold includes a death loss of 1.0%

Important to account for heifers that "fall out" along the way

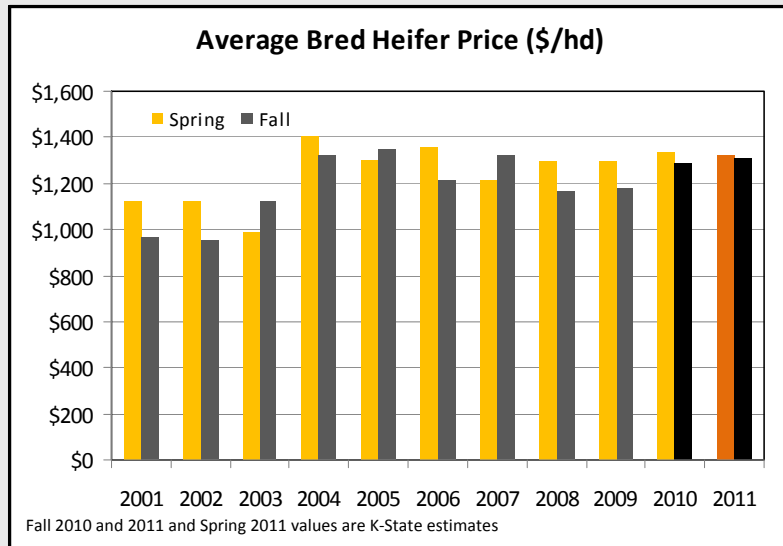


Budget assumptions...

- Prices for heifer calf and heifers "falling out" are from futures-based forecasts using average Wed prices in Oct 2010 and relevant futures contracts
- Bred heifer price is based on data from the Missouri Show-Me-Select™ Replacement Heifer Sales (adjusted to account for time to calving)



Missouri Show-Me-Select™ Heifer Sales



Source: Parcell and Franken



Budget assumptions...

Bred heifer price calculations:

Fall 2011 Show Me Select™ price	\$1,309
Assumed premium	10%
<hr/>	
Average market price	\$1,190
+ cost adjustment (feed, labor, fuel)	\$144
<hr/>	
Final bred heifer price	\$1,334

(based on heifer purchased ~90 days prior to calving)



Projected budget...

Farm Management Guide		MF-2566
Raising Beef Replacement Heifers		
Department of Agricultural Economics - www.AgManager.info		
Kansas State University Agricultural Experiment Station and Cooperative Extension Service		
Kevin Dhuyvetter Agricultural Economist Farm Management	Michael Langemeier Agricultural Economist	Sandy Johnson Animal Scientist, NW
		Your Farm
RETURNS PER HEAD		
1. Market Animals:		
a. Springer heifer -- \$1,334/hd (83.5%)	\$1,113.80	_____
b. Yearling heifer -- 750 lbs (2.0%)	15.77	_____
c. Cull heifer after breeding -- 960 lbs (12.0%)	115.11	_____
d. Cull heifer at calving -- 1,100 lbs (1.5%)	16.87	_____
2. Less cost of heifer calf (550 lbs @ \$108.48/cwt)	\$596.64	_____
3. Less death loss (1.0% of total of line 1)	12.62	_____
4. Other Income	0.00	_____
A. GROSS RETURNS PER HEAD	\$652.29	_____

**Dollars to work with to cover costs
from weaning until calving.**



Projected budget...

Farm Management Guide		MF-2566
Raising Beef Replacement Heifers		
		Your Farm
COSTS PER HEAD:		
5. Summer pasture (4.66 AUMs @ \$17.70/AUM)	\$82.15	_____
6. Prairie hay (6,427 lbs @ \$72.00/ton)	213.38	_____
7. Alfalfa hay (0 lbs @ \$115.00/ton)	0.00	_____
8. Grain sorghum (0.00 bu @ \$5.05/bu)	0.00	_____
9. Corn (19.54 bu @ \$5.26/bu)	95.75	_____
10. Protein supplement (40 lbs @ \$350/ton)	6.90	_____
11. Mineral and salt (72 lbs @ \$520/ton)	17.57	_____
12. Labor (5.0 hrs @ \$13.00/hr)	65.00	_____
13. Veterinary, drugs, and supplies	24.50	_____
14. Marketing costs	12.00	_____
15. Breeding cost	35.45	_____
16. Utilities, fuel, and oil	20.40	_____
17. Facility and equipment repairs	31.84	_____
18. Professional fees (legal, accounting, etc.)	4.96	_____
19. Miscellaneous	17.84	_____
20. Depreciation on facilities and equipment	10.09	_____
21. Interest on facilities and equipment	2.95	_____
22. Insurance and taxes on facilities and equipment	0.49	_____
B. SUB TOTAL	\$641.27	_____
23. Interest heifer calf and 1/2 operating costs @ 7.0%	87.10	_____
C. TOTAL COSTS PER HEAD	\$728.37	_____
D. RETURNS OVER TOTAL COSTS (A - C)	-\$76.08	_____
24. Total cost per head per day	\$1.45	_____
E. SPRINGER HEIFER BRAKEVEN PRICE, \$/head	\$1,425.01	_____



Why people raise replacement heifers...

(even though returns over total cost might be negative)

Farm Management Guide

MF-2566

Raising Beef Replacement Heifers

	Below average pasture rent	Your Farm
COSTS PER HEAD:		
5. Summer pasture (4.66 AUMs @ \$17.70/AUM)	\$82.15	\$65.72
6. Prairie hay (6,427 lbs @ \$72.00/ton)		160.03
7. Alfalfa hay (0 lbs @ \$115.00/ton)	Hay and grain are valued at cost of production (i.e., valued below market price)	0.00
8. Grain sorghum (0.00 bu @ \$5.05/bu)		0.00
9. Corn (19.54 bu @ \$5.26/bu)		71.81
10. Protein supplement (40 lbs @ \$350/ton)	6.90	6.90
11. Mineral and salt (72 lbs @ \$520/ton)	17.57	17.57
12. Labor (5.0 hrs @ \$13.00/hr)	No charge for labor	0.00
13. Veterinary, drugs, and supplies	No marketing costs	24.50
14. Marketing costs		0.00
15. Breeding cost	35.45	35.45
16. Utilities, fuel, and oil	Facility and equip is not maintained	20.40
17. Facility and equipment repairs		10.00
18. Professional fees (legal, accounting, etc.)	Do not allocate 100% of farm expenses	2.00
19. Miscellaneous		7.00
20. Depreciation on facilities and equipment		0.00
21. Interest on facilities and equipment	Facility and equip are depreciating	0.00
22. Insurance and taxes on facilities and equipment	Little or no return on equity	0.49
B. SUB TOTAL	\$641.27	\$421.87
23. Interest heifer calf and 1/2 operating costs @ 7.0%	87.10	43.55
C. TOTAL COSTS PER HEAD	\$728.37	\$465.42
D. RETURNS OVER TOTAL COSTS	Total cost ~\$263/hd lower	-\$76.08
24. Total cost per head per day	\$1.45	\$0.93
E. SPRINGER HEIFER BREAKEVEN PRICE, \$/head	\$1,425.01	\$1,110.10

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Raising replacement heifers...

- Based on average costs or production, and including returns on all resources, it appears producers can buy replacements at a lower cost than they can raise them.
- However, if your costs are below average (legitimately) it makes sense for producers to raise their own replacements.
- In other words, the answer to whether you should raise or purchase your replacements fits the classical economist response -- *It depends...*

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Another way of looking at this...

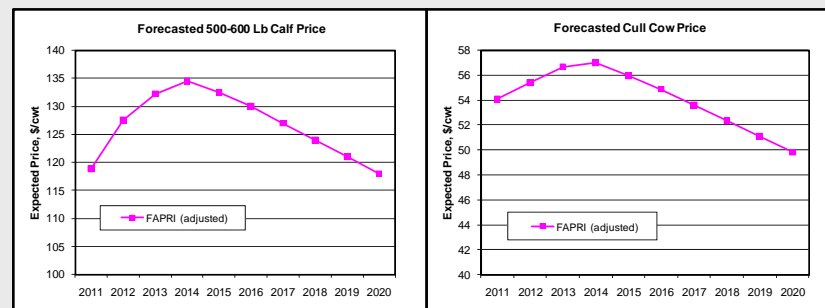
- Because replacement heifers reflect an asset that will be used for multiple years, the economic analysis should account for the time value of money (applies whether heifers are raised or purchased).
- Net Present Value (NPV) accounts for the time as to when income will be received and expenses paid (i.e., discounts values occurring in the future).
- Interpretation: NPV = The amount you could pay, accounting for income and expenses, that results in a rate of return equal to the discount rate used.

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NPV assumptions...

- Prices based on FAPRI projections (2011-2015) with adjustments for KS and additional years.



- Annual cow costs of \$500, \$575, and \$650.
- Discount rate of 7.5%

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NPV analysis...

Input Assumptions

Number of replacements purchased	100	Percent marketable calves (1 - death loss)	96.0%
Year of purchase	2011	Annual cow death loss	0.5%
First year for calf sales	2011	Cows culled for non-breeding reason (health)	3.5%
Cull cow weight, lbs/hd	1,250	Annual inflation rate on costs	0.0%
Annual cow costs, \$/year	\$500	Annual increase in average weaning weight	0.0%
Price scenario to use (1-4) (FAPRI (adjusted))	4	Discount rate (interest rate)	7.5%
Weaning weight scenario to use (1-3)	1		

Net Present Value Analysis

Year	Cows at			Prices, \$/cwt		Calf Income	Cull Income		Cost	Cost Adj.	Net Income	Discount factor	NPV**
	BOY*	Calf	Calf wt	Calf	Cull		Health	Quality					
2011	100.0	1	530	\$118.90	\$54.08	\$605	\$23.66	\$649	\$500	\$0	\$129	1.0000	\$778
2012	96.0	2	540	\$127.53	\$55.42	\$635	\$23.28	\$637	\$480	\$0	\$178	0.9302	\$887
2013	92.2	3	550	\$132.26	\$56.69	\$644	\$22.86	\$624	\$461	\$0	\$206	0.8653	\$1,012
2014	88.5	4	555	\$134.57	\$57.02	\$634	\$22.07	\$606	\$442	\$0	\$214	0.8050	\$1,132
2015	84.9	5	560	\$132.52	\$55.94	\$605	\$20.79	\$573	\$425	\$0	\$201	0.7488	\$1,224
2016	81.5	6	560	\$130.00	\$54.88	\$570	\$19.58	\$535	\$408	\$0	\$182	0.6966	\$1,294
2017	78.3	7	555	\$127.00	\$53.61	\$530	\$18.36	\$503	\$391	\$0	\$157	0.6480	\$1,349
2018	75.1	8	553	\$124.00	\$52.34	\$494	\$17.21	\$471	\$376	\$0	\$136	0.6028	\$1,389
2019	72.1	9	550	\$121.00	\$51.08	\$461	\$16.12	\$441	\$361	\$0	\$116	0.5607	\$1,417
2020	69.3	10	548	\$118.00	\$49.81	\$430	\$15.09	\$411	\$346	\$0	\$98	0.5216	\$1,436
* BOY = Beginning of year			550	\$126.58	\$54.09								** Net present value if replacement is sold in this year

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NPV analysis – annual costs have a big impact

Net Present Value Analysis

Year	Calf	Annual cost = \$500		Annual cost = \$575		Annual cost = \$650	
		NPV*	diff**	NPV*	diff**	NPV*	diff**
2011	1	\$778	-\$109	\$703	-\$42	\$628	\$24
2012	2	\$887	\$0	\$745	\$0	\$603	\$0
2013	3	\$1,012	\$125	\$810	\$65	\$608	\$5
2014	4	\$1,132	\$245	\$877	\$132	\$622	\$19
2015	5	\$1,224	\$337	\$922	\$176	\$619	\$16
2016	6						
2017	7						
2018	8						
2019	9	\$1,417	\$530	\$969	\$224	\$522	-\$82
2020	10	\$1,436	\$549	\$961	\$216	\$486	-\$117

A producer with \$150/cow lower annual costs could pay twice as much to buy or develop a heifer and still realize the same rate of return (all else equal).

* Net present value if replacement is sold in this year

** Difference in NPV between selling in this year versus after the second calf

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NPV analysis – years in herd has a big impact

Net Present Value Analysis

Year	Calf	Annual cost = \$500		Annual cost = \$575		Annual cost = \$650	
		NPV*	diff**	NPV*	diff**	NPV*	diff**
2011	1	\$778	-\$109	\$628	\$24		
2012	2	\$887	\$0	\$603	\$0		
2013	3	\$1,012	\$125	\$608	\$5		
2014	4	\$1,132	\$245	\$622	\$19		
2015	5	\$1,224	\$337	\$619	\$16		
2016	6	\$1,294	\$407	\$603	\$0		
2017	7	\$1,349	\$462	\$582	-\$21		
2018	8	\$1,389	\$502	\$554	-\$49		
2019	9	\$1,417	\$530	\$522	-\$82		
2020	10	\$1,436	\$549	\$961	\$216	\$486	-\$117

* Net present value if replacement is sold in this year

** Difference in NPV between selling in this year versus after the second calf

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Summary...

- The vast majority of heifers in the US beef industry are raised as opposed to purchased
- The economics of whether heifers should be raised or purchased depends on *MANY* factors (e.g., genetics, costs, resources available, management)
- Heifers that are developed with low cost, but then fall out of herd are likely more costly than higher priced heifers that remain in herd longer
- Tremendous variability → individual producers need to identify their comparative advantage regarding replacement heifer strategies

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Additional information/resources...

<http://animalscience.tamu.edu/images/pdf/beef/beef-buying-vs-raising-replacement-heifers.pdf>

<http://agecon.uwyo.edu/marketing/mngtcmkt/RplcHeifr.pdf>

<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1094&context=rangebeefcowsymp>

<http://www.csubeef.com/content/view/70/71/>

http://www.uaex.edu/Other_Areas/publications/PDF/FSA-3076.pdf

<http://adaeveningnews.com/agnews/x334296946/Buying-vs-raising-replacement-heifers>

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The screenshot displays the AgManager.info website interface. At the top, there is a navigation menu with links for 'Home', 'Contact Us', 'User Info', 'Site Map', and 'Feedback'. A search bar is located in the top right corner. The main content area features a central banner for 'AgManager.info' with the tagline 'Providing information and Tools For The Competitive Business'. Below this, there are several featured articles and advertisements, including '2010 AAEA Outstanding Electronic Media Education Award', 'MAST 2010-2011 Class Enrolling Now', and '2010 Kansas Income Tax Institute'. A 'Recent Updates' sidebar on the right lists various news items with dates and authors. The website footer includes the Kansas State University logo and the text 'www.agmanager.info'.



If interested in receiving weekly *AgManager.info Update* or any of our other Ag Econ newsletters via email, please let me know (kcd@ksu.edu or 785-532-3527).