

2021

Financing Beef Cow Herd Building for Beginning Ranchers

Abby ShalekBriski

Oklahoma State University, abieden@okstate.edu

Eric A. DeVuyst

Oklahoma State University, ERIC.DEVUYST@OKSTATE.EDU

Cheryl S. DeVuyst

Oklahoma State University, cheryl.devuyst@okstate.edu

Roger Sahs

Oklahoma State University, roger.sahs@okstate.edu

Matt Stockton

University of Nebraska - Lincoln, matt.stockton@unl.edu

See next page for additional authors

Follow this and additional works at: <https://docs.lib.purdue.edu/jafe>



Part of the [Agricultural and Resource Economics Commons](#)

Recommended Citation

ShalekBriski, Abby; DeVuyst, Eric A.; DeVuyst, Cheryl S.; Sahs, Roger; Stockton, Matt; and Ramy, Katlin (2021) "Financing Beef Cow Herd Building for Beginning Ranchers," *Journal of Applied Farm Economics*: Vol. 4 : Iss. 1, Article 2.

DOI: 10.7771/2331-9151.1052

Available at: <https://docs.lib.purdue.edu/jafe/vol4/iss1/2>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

This is an Open Access journal. This means that it uses a funding model that does not charge readers or their institutions for access. Readers may freely read, download, copy, distribute, print, search, or link to the full texts of articles. This journal is covered under the [CC BY-NC-ND license](#).

Financing Beef Cow Herd Building for Beginning Ranchers

Authors

Abby ShalekBriski, Eric A. DeVuyst, Cheryl S. DeVuyst, Roger Sahs, Matt Stockton, and Katlin Ramy

Financing Beef Cow Herd Building for Beginning Ranchers

Abby ShalekBriski (Oklahoma State University), Eric A. DeVuyst (Oklahoma State University), Cheryl S. DeVuyst (Oklahoma State University), Roger Sahs (Oklahoma State University), Matt Stockton (University of Nebraska–Lincoln), and Katlin Ramy (Oklahoma State University)

ABSTRACT

Intensive capital requirements relative to cash flows available inhibit the entry of beginning producers into the cattle industry. Here, we propose and analyze a strategy for beginning ranchers to build a herd. Over a three-year cycle, new producers borrow cash needed to purchase 450-pound heifers in the first year, breed heifers, sell open heifers and bull calves, retain heifer replacements, rebreed the two-year-old cows, and eventually sell bred two-turning-three cows 27 months after the initial heifer purchase. The goal is to retain a group of debt-free heifers. Analyses conducted over 14 cycles of 27 months each across three cattle markets, Oklahoma, Nebraska, and North Dakota, indicate that this herd-building strategy appears to be financially feasible for new producers, in most cycles. Positive net cash flows occurred for producers in Oklahoma for 13 of 14 cycles, 11 of 14 cycles in North Dakota, and 10 of 14 cycles in Nebraska. Positive net returns were realized in at least 12 cycles in each location. Sensitivity analyses were conducted on revenues and costs to evaluate the robustness of the strategy.

KEYWORDS

beginning farmer,
cow-calf, financing
herd building

INTRODUCTION

Beginning farm producers have difficulty getting started in the industry. Along with labor and management, land and capital are needed to be able to farm but acquiring these two factors of production is challenging (Ahearn, 2011). A survey conducted by Ackoff et al. (2017) showed land acquisition as the number one challenge beginning farmers face due to the high per-acre value of farm ground. Leasing farm ground is an affordable alternative but not a viable option for the long-term. Leasing is not as stable and secure as purchasing farm ground and may prevent beginning farmers from investing in the infrastructure needed for their operation (Ackoff et al., 2017; Manning, 2019). Likewise, owning higher land acreage amounts is needed to grow the operation and earn positive net returns (USDA-ERS, 2013). Student loan debt is also a challenge beginning farmers face, and beginning full-time farmers do not qualify for loan forgiveness via the Public Service Loan Forgiveness Program (Manning, 2019). As a result, it is difficult for beginning farmers to make their

student loan payments and finance their farming operation (Ackoff et al., 2017; Manning, 2019). Apart from land acquisition and student loan debt, not knowing how to efficiently run a farming operation can be a downfall if beginning farmers lack the knowledge and tools needed to create a business plan (Manning, 2019).

These financial difficulties starting a farm or ranch are pronounced in cow-calf production. In the United States, cow-calf production is highly capital intensive with long time lags between cash inflows. Even for established producers, financing the rebuilding herds following drought-induced liquidation is challenging (Doye et al., 2013). The lag between the purchase of inputs, such as breeding stock, and the sale of outputs can exceed two years (Bierlen et al., 1998). This can lead to insufficient cash flow to maintain the business. When purchasing breeding cattle, beginning and younger producers often struggle with liquidity due to low equity and unproven cash flow. Trejo-Pech et al. (2021) report that beginning cow-calf producers can expect a cash flow deficit of about \$15,000 annually for the first seven years of operation.

Nehring et al. (2014) measured the impact of factors in the economic and financial success of beef cow producers. Two important factors, crop acres and number of cows, were found to improve profitability and solvency. Given the high capital requirements of acquiring land and breeding cows, beginning operators are less likely to control large acreages and breeding herds. Thus, their chances of financial success are not promising.

In response, many lenders, government agencies, and universities offer educational programs and/or financial programs to assist beginning producers to successfully enter agriculture production (Katchova & Dinterman, 2018). Programs such as the Beginning Farmer and Rancher Development Program (USDA, n.d.a), Environmental Quality Incentives Program (USDA-NRCS, n.d.b), and provisions in the Agriculture Improvement Act of 2018 (USDA-ERS, n.d.c) aim to provide support to beginning farmers and ranchers.

While these programs help facilitate the transfer of institutional knowledge and funds, production, marketing, and financing strategies to mitigate entry barriers faced by beginning ranchers are needed. Building a cow-calf herd is particularly difficult due to significant lags between cash outlays for breeding stock purchases and feed relative to cash inflows from weaned calf sales. To help beginning producers build their herds, this study develops and analyzes a beef cow herd-building strategy for Oklahoma, Nebraska, and North Dakota beginning cow-calf producers. The intent is to provide beginning cattle producers with a framework to analyze the financial feasibility of starting a cow herd.

BUILDING STRATEGY

Before analyzing, the proposed strategy is outlined here. Using borrowed funds, a beginning rancher purchases 450-lb. weaned heifers. A 27-month note at 6% APR is assumed with 100% financing on the heifer purchase. (The analysis assumes 100 head purchased, but the strategy is not dependent on that number.) An operating note at 5% APR is used to finance 75% of production expense over the 27-month production cycle. In order for a cycle to be considered successful, both the initial heifer purchase note and operating note must be paid in full at the end of each 27-month cycle.

Table 1. Cattle Inventory per Year

Inventory*	Year 1	Year 2	Year 3
Replacement Heifers	100	0	29
Bred Heifers	0	84	0
Steer Calves (sold)	0	0	41
Heifer Calves (sold)	0	0	12
Open Cows (sold)	0	15	13
Bred Cows (sold)	0	0	71

*Calculations are net of death loss and culling.

Weaned heifers are bred at 14.5 to 15 months of age with open heifers sold at 810 lbs. at market price as feeder heifers. Revenue generated from the sale of feeder heifers is used to pay down debt and feed and veterinary expenses. Bred heifers calve as two-year-olds. At 205 days of age, 450-lb. steer calves and 30% of the 425-lb. heifer calves are sold as weaned calves. The remaining 70%¹ of weaned heifers are retained as breeding stock. Cows are rebred three months after calving and sold as “twos-coming-threes”² as this age category has the highest market value for bred cows. Open cows are sold at market price for cull cows.³ By selling weaned steer calves, 30% of weaned heifer calves, rebred cows, and open cows, the strategy might generate sufficient cash to retire all debt, leaving the producer with approximately 29 heifer calves. From the initial purchase to the sale of bred cows and weaned calves, a cycle is completed in approximately 27 months. [Table 1](#) summarizes the herd inventory for our strategy.

PRODUCTION ASSUMPTIONS

Phase I

Production assumptions are reported in [Table 2](#). The base assumption is a 100-head herd. The initial 100 head of 450-lb. heifer calves are purchased in the first week of November, 100% financed at 6% interest on a 27-month fixed note with payment due at the end of the 27-month cycle. In the first year, a 0.5% death loss is assumed. Heifers are bred at 14.5 to 15 months. A 15% cull rate for open heifers, which are sold as 810-lb. feeder heifers, is assumed. Rations and budgets for each stage of production were developed. Oklahoma

Table 2. Production Assumptions

<i>Phase I</i>	
Heifer Weight at Purchase	450 pounds
Heifer Age at Purchase	205 days
Death Loss	0.50%
Percent of Initial Heifer Purchase Financed	100%
Interest Rate of Financed Initial Heifer Purchase	6%
Age at Breeding	450 days
Age at First Cull	570 days
Cull Rate	15%
Weight at First Cull	810 pounds
<i>Phase II</i>	
Age at Calving	733 days
Weaning Percentage	98%
Calf Age at Weaning	205 days
Weaning Weight: Steer Calves	450 pounds
Weaning Weight: Heifer Calves	425 pounds
Cow Rebreding Age	833 days
Cull Open Cows Age	938 days
Weight of Culled Open Cows	1,180 pounds
<i>Phase III</i>	
Conception Percentage	85%
Age of Bred “Twos-coming-Threes” when sold	1,028 days
Weight of Bred “Twos-coming-Threes” when sold	1,270 pounds
<i>Assumptions for All Phases</i>	
Percentage of Operating Expenses Financed	75%
Interest Rate of Operating Expenses Financed	5%

rations were developed using Cowculator (Oklahoma State University, 2017) and annual prices of inputs and pasture land rents applied to generate annual production budgets. Nebraska ratios were developed based on commonly used production practices in western Nebraska and then used to generate annual budgets. Published annual production budgets (North Dakota Career and Technical Education, 2021) were used for North Dakota producers.

Phase II

Heifers are assumed to calve at 24 months. The calf crop is assumed to be 50% bull calves and 50%

heifer calves. Calves are weaned at 205 days with a 98% weaning percentage. Bull/steer calves are weaned at 450 lbs. and heifer calves are weaned at 425 lbs. with 70% of the heifer calves retained for replacement.

Phase III

The 24-month-old cows are rebred in August, approximately three months after their first calving. A conception rate of 85% is assumed. Open cows are culled in November, approximately two years after their initial purchase date. The remaining cows are sold in February of the next year. They are marketed as twos-coming-threes bred

Table 3. Dates from Weekly and Monthly Price Series Used

Year	Initial Heifer Purchase	Cull of Open Heifers	Weaned Heifers and Steer Calves Sold	Sell Open Cows	Sell Bred “Twos-coming-Threes”
2003	11/7/2003	10/29/2004	11/4/2005	11/4/2005	Feb. 2006
2004	11/5/2004	10/28/2005	11/3/2006	11/3/2006	Feb. 2007
2005	11/4/2005	10/27/2006	11/2/2007	11/2/2007	Feb. 2008
2006	11/3/2006	11/2/2007	11/7/2008	11/7/2008	Feb. 2009
2007	11/2/2007	10/31/2008	11/6/2009	11/6/2009	Feb. 2010
2008	11/7/2008	10/30/2009	11/5/2010	11/5/2010	Feb. 2011
2009	11/6/2009	10/29/2010	11/4/2011	11/4/2011	Feb. 2012
2010	11/5/2010	10/28/2011	11/2/2012	11/2/2012	Feb. 2013
2011	11/4/2011	11/2/2012	11/8/2013	11/8/2013	Feb. 2014
2012	11/2/2012	11/1/2013	11/7/2014	11/7/2014	Feb. 2015
2013	11/8/2013	10/31/2014	11/6/2015	11/6/2015	Feb. 2016
2014	11/7/2014	10/30/2015	11/4/2016	11/4/2016	Feb. 2017
2015	11/6/2015	10/28/2016	11/3/2017	11/3/2017	Feb. 2018
2016	11/4/2016	10/27/2017	11/2/2018	11/2/2018	Feb. 2019

Table 4. Production Costs (\$ per head)

<i>Phase I</i>	
Feed Expense: Pre-breeding	250d
Veterinary and Medical Expense: Pre-breeding	\$15
Breeding Cost	\$25
Feed Expense: Gestation	283d
Veterinary and Medical Expense: Gestation	\$5
<i>Phase II</i>	
Feed Expense: Lactation, Rebreeding, and Post-Lactation	205d
Veterinary and Medical Expense: Lactation, Rebreeding, and Post-Lactation	\$15
Breeding Cost	\$25
<i>Phase III</i>	
Feed Expense: Bred Cows Post Weaning	90d
Open Cows Post Weaning	7d
Veterinary and Medical Expense	\$5

DATA

approximately six months. [Table 3](#) outlines the corresponding dates used for the sale price data in the three phases. [Table 4](#) summarizes cattle weight assumptions, death loss, weaning information, and age at the different phases.

Veterinary, medical and breeding costs associated with each phase are reported in [Table 4](#). Feed costs were based on Oklahoma, Nebraska, and North Dakota monthly hay prices as reported by the USDA (USDA-NASS, n.d.d, e, f) from 2003

to 2019. Since USDA hay prices were monthly, the average of the monthly prices was calculated and multiplied by the number of days fed in each time period. Statewide average pasture rental rates for Oklahoma were from the biennial surveys of pasture rental rates from Doye et al. (2002), Doye and Sahs (2004–2016), and Sahs (2018). Nebraska statewide-average historical pasture rental rates were taken from the Nebraska Farm Real Estate Market Highlights Report 2018–2019 (Jansen & Stokes, 2018). If the statewide-average pasture rental rate was not reported for a given year, the average of two neighboring states was used. North Dakota published production budgets were taken from North Dakota Career and Technical Education (2021).

Weekly cattle prices were taken from the Livestock Marketing Information Center for each state. If a weekly price for Nebraska or North Dakota was missing, a neighboring state's weekly price was used. If no suitable price was available, a price was imputed by calculating the average ratio in prices between the missing price and the Oklahoma price. The Oklahoma price was then multiplied by the calculated factor to approximate a value for the missing price. In some instances, the price for bred heifers was not reported. So, a

price was imputed by calculating the average ratio in prices between the missing price and the price series for young bred cows. The corresponding price for young bred cows was multiplied by the factor to approximate a value for the missing price. Cull cow prices were from monthly slaughter cow data compiled by LMIC (2021). Since no monthly slaughter cow data was reported for Nebraska or North Dakota, slaughter cow data from Montana was used for North Dakota and slaughter cow data from Colorado was used for Nebraska.

RESULTS

To help understand the cash flows during a production cycle, [Table 5](#) presents the projected cash flow timing and amounts for the Oklahoma 2007 cycle. The 2007 cycle was chosen as it's close to zero net cash flow, demonstrating tight points for financing. As is to be anticipated, the first 12 months of the project are the most financially taxing, with no revenues. At the end of the first year, cull heifers are sold, the first infusion of revenue. Then, the producer must wait another 12 months until revenue is received from weaned steers, some weaned heifers, and cull (open) cows.⁴ In some

Table 5. Example Cash Flow Budget: Oklahoma 2007 Cycle

Date	Item	hd	Financed	Cash in/out	Term Note Balance	Operating Note Balance
1-Nov-07	Heifer purchase	100	\$49,950	-\$49,950	\$49,950	
4-Jul-08	Operating exp through breeding	100	\$8,100	-\$10,800		\$8,100
1-Nov-08	Open heifer sales	15		\$10,692	\$31,158	\$0
1-Nov-08	Bred heifer inventory	84				
13-Apr-09	Operating exp through gestation	84	\$10,395	-\$13,860	\$31,158	\$13,860
1-Nov-09	Operating exp through lactation	84		\$12,180		
1-Nov-09	Sell weaned calves	53		\$26,525	\$18,493	
8-Nov-09	Sell open cows	13		\$6,162	\$12,331	
1-Feb-10	Operating exp post wean	84	\$3,591	-\$4,788		\$3,591
1-Feb-10	Sell bred cows	71		\$55,735	\$0	\$0
	Interest on operating loan			-\$949		
	Interest on term debt			-\$6,260		
1-Feb-10	Net cash position			\$326		

high-revenue cycles (e.g., 2012 and 2013), producers are debt free at this point. However, debt is retired in most cycles when bred cows are sold at the end of the 27-month cycle, as is the case for the 2007 Oklahoma cycle.

Tables 6 through 11 report the net cash flow for Oklahoma, North Dakota, and Nebraska producers, respectively, over each of 27-month cycles. In 13 of the 14 cycles investigated, the Oklahoma budgets have positive net cash flow. North Dakota

budgets are slightly less favorable with 11 cycles projecting positive net cash flow and 13 cycles with positive net return.⁵ Finally, the Nebraska budgets are again slightly less optimistic. Ten of the cycles are projected to have positive net cash flow and 12 were projected to have positive net return.

The 2012 and 2014 cycles are worth discussing further. Producers starting herds in 2014 were projected to have negative net cash flow over the 2.5-year period (2014–2017) in all three states.

Table 6. Sensitivity of Net Cash Flow and Net Return due to Reduced Revenue for Oklahoma

Year	Revenue as a Percent of Baseline					
	Baseline (100%)	95%	90%	85%	80%	75%
2003	\$38963	\$32500	\$26038	\$19576	\$13113	\$6651
	\$54594	\$47350	\$40106	\$32862	\$25618	\$18374
2004	\$11956	\$5993	\$30	-\$5933	-\$11896	-\$17859
	\$25876	\$13224	\$12528	11832	-\$760	-\$7419
2005	\$19132	\$13023	\$6914	\$805	-\$5305	-\$11414
	\$33139	\$26330	\$19520	\$12711	\$5901	-\$908
2006	\$7181	\$2276	-\$2629	-\$7535	-\$13876	-\$19141
	\$19999	\$15094	\$10189	\$10189	-\$3622	-\$9527
2007	\$326	-\$4613	-\$9552	-\$14492	-\$19431	-\$24370
	\$12361	\$6820	\$1279	-\$4262	-\$9803	-\$15344
2008	\$39147	\$34465	\$29782	\$25100	\$20417	\$15735
	\$53270	\$47882	\$42493	\$37104	\$31716	\$26327
2009	\$55004	\$16227	\$15373	\$14519	\$13665	\$12881
	\$72085	\$63778	\$55471	\$47164	\$38857	\$30550
2010	\$55070	\$46253	\$37437	\$28620	\$19804	\$10987
	\$74210	\$64436	\$54663	\$44889	\$35116	\$25342
2011	\$69732	\$60273	\$50813	\$41354	\$31895	\$22436
	\$91917	\$81348	\$70780	\$60211	\$49643	\$39075
2012	\$126118	\$111371	\$96624	\$81877	\$67130	\$52383
	\$162136	\$145588	\$129040	\$112492	\$95944	\$79396
2013	\$90159	\$78802	\$67444	\$56087	\$44730	\$33372
	\$118231	\$105470	\$92790	\$79948	\$67187	\$54426
2014	-\$24508	-\$32794	-\$41008	-\$49222	-\$57435	-\$65649
	-\$9026	-\$18027	-\$27018	-\$36009	-\$45000	-\$53991
2015	\$3032	-\$4745	-\$12522	-\$20299	-\$28076	-\$35853
	\$22636	\$13879	\$5122	-\$3653	-\$12393	-\$21150
2016	\$38695	\$31166	\$23637	\$16108	\$8578	\$1049
	\$57777	\$49294	\$40811	\$32327	\$23844	\$15361
Cash flow \geq 0	13 years*	11 years	10 years	9 years	8 years	8 years
Net return \geq 0	13 years	13 years	13 years	11 years	9 years	8 years

* Number of years (out of 14 simulated) with positive net cash flow (top) and net returns (bottom).

Table 7. Sensitivity of Net Cash Flow and Net Return due to Increased Cost for Oklahoma

Year	Cost as a Percent of Baseline					
	Baseline (100%)	105%	110%	115%	120%	125%
2003	\$38963	\$34449	\$29934	\$25420	\$20906	\$16392
	\$54594	\$50080	\$45565	\$41051	\$36537	\$32023
2004	\$11956	\$6591	\$1225	-\$4140	-\$9505	-\$14870
	\$25876	\$20511	\$15145	\$9780	\$4415	-\$950
2005	\$19132	\$13980	\$8827	\$3675	-\$1478	-\$6631
	\$33139	\$27987	\$22834	\$17682	\$12529	\$7376
2006	\$7181	\$2276	-\$2629	-\$7535	-\$12440	-\$17345
	\$19999	\$15094	\$10189	\$5283	\$378	-\$4527
2007	\$326	-\$4613	-\$9552	-\$14492	-\$19431	-\$24370
	\$12361	\$6820	\$1279	-\$4262	-\$9803	-\$15344
2008	\$39147	\$34465	\$28782	\$25100	\$20417	\$15735
	\$53270	\$47882	\$42493	\$37104	\$31716	\$26327
2009	\$55004	\$50301	\$45598	\$40896	\$36193	\$31490
	\$72085	\$60971	\$60971	\$55414	\$49858	\$44301
2010	\$55070	\$49007	\$42944	\$36881	\$30818	\$24754
	\$74210	\$67190	\$60170	\$53150	\$46130	\$39019
2011	\$69732	\$63759	\$57787	\$51814	\$45841	\$39869
	\$91917	\$81348	\$77753	\$70671	\$63589	\$56508
2012	\$126118	\$117677	\$109236	\$100794	\$92353	\$83912
	\$162136	\$151894	\$141652	\$131410	\$121168	\$110926
2013	\$90159	\$83310	\$76460	\$69611	\$62761	\$55912
	\$118231	\$109978	\$101725	\$93472	\$85219	\$79966
2014	-\$24508	-\$34023	-\$43466	-\$52909	-\$62352	-\$71794
	-\$9026	-\$19256	-\$29476	-\$39696	-\$49916	-\$60136
2015	\$3032	-\$4593	-\$12219	-\$19844	-\$27469	-\$35095
	\$22636	\$14031	\$5425	-\$3181	-\$11786	-\$20392
2016	\$38695	\$33101	\$27506	\$21912	\$16317	\$10723
	\$57777	\$51229	\$44680	\$38132	\$31583	\$25034
Cash flow \geq 0	13 years*	11 years	10 years	9 years	8 years	8 years
Net return \geq 0	13 years	13 years	13 years	11 years	11 years	9 years

* Number of years (out of 14 simulated) with positive net cash flow and net returns.

This occurred due to a sharp uptick in cattle prices in fall 2014, when heifers were purchased. However, cattle prices were lower in 2016 when steers and heifers from the first calving were sold. Consequently, producers starting in 2014 would have “bought high” and “sold low.” Conversely, volatile cattle prices of 2010 to 2015 lead to large positive net cash flows for producers initially buying heifers in 2009 to 2013. In juxtaposition to the

producers previously mentioned, these producers “bought low” and “sold high.” Net cash flows and returns for the cycle beginning in 2012 are best described as “gaudy” for all three states. Heifers purchased in fall 2012 had purchase prices of around \$160 per cwt. Their first calves sold in fall 2014 had prices approaching \$300 per cwt, and the now 2.5-year-old bred cows were sold for around \$2,650 per head. Of course, the 2012

Table 8. Sensitivity of Net Cash Flow and Net Return due to Reduced Revenue for North Dakota

Year	Revenue as a Percent of Baseline					
	Baseline (100%)	95%	90%	85%	80%	75%
2003	\$26681	\$21257	\$15834	\$10410	\$4986	-\$437
	\$43646	\$37374	\$31102	\$24830	\$18558	\$12286
2004	\$23057	\$17793	\$12529	\$7266	\$2002	-\$3262
	\$38253	\$32229	\$26206	\$20182	\$14159	\$8135
2005	\$21475	\$15472	\$9469	\$3466	-\$2536	-\$8539
	\$35627	\$28916	\$22206	\$15496	\$8785	\$2075
2006	-\$5050	-\$9585	-\$14121	-\$18656	-\$23191	-\$27726
	\$7594	\$2426	-\$2741	-\$7908	-\$13076	-\$18243
2007	-\$2351	-\$6690	-\$11030	-\$15369	-\$19709	-\$24048
	\$9742	\$4798	-\$146	-\$5090	-\$10034	-\$14978
2008	\$47836	\$41699	\$35562	\$29425	\$23288	\$17151
	\$63003	\$56108	\$49212	\$42317	\$35421	\$28526
2009	\$74350	\$67452	\$60554	\$53655	\$46757	\$39859
	\$92939	\$85111	\$77284	\$69456	\$61628	\$53801
2010	\$71468	\$63940	\$56413	\$48885	\$41357	\$33830
	\$90347	\$81875	\$73404	\$64932	\$56461	\$47989
2011	\$98253	\$88614	\$78974	\$69334	\$59694	\$50054
	\$120351	\$109607	\$98862	\$88117	\$77372	\$66627
2012	\$200796	\$187276	\$173755	\$160235	\$146714	\$133193
	\$237220	\$221879	\$206537	\$191195	\$175853	\$160511
2013	\$91169	\$81631	\$72092	\$62554	\$53016	\$43478
	\$116631	\$105819	\$95008	\$84197	\$73386	\$62575
2014	-\$45521	-\$52284	-\$59048	-\$65812	-\$72575	-\$79339
	-\$30441	-\$37958	-\$45476	-\$52994	-\$60511	-\$68029
2015	\$40024	\$31868	\$23712	\$15556	\$7400	-\$756
	\$59889	\$50740	\$41590	\$32441	\$23292	\$14143
2016	\$73747	\$65691	\$57634	\$49578	\$41522	\$33465
	\$94366	\$85279	\$76192	\$67104	\$58017	\$48930
Cash flow \geq 0	11 years*	11 years	11 years	11 years	10 years	8 years
Net return \geq 0	13 years	13 years	11 years	11 years	11 years	11 years

* Number of years (out of 14 simulated) with positive net cash flow and net returns.

cycle is an anomaly but the same could be said for the 2014 cycle, just with the high and low prices reversed in order.

Tables 6 through 11 also report the results of sensitivity analyses on revenues and costs. In Tables 6, 8, and 10 revenues were reduced in 5% increments and the resulting projected net cash flows and net returns are reported. Obviously, the frequency of positive net cash flow and net returns declines as

revenues are reduced. In the most extreme example, a 25% reduction in all revenues, the number of cycles with positive net cash flows and net returns are down to eight. Still, this suggests a robustness in the strategy. Even if the projected revenues are cut by a quarter, the strategy is slightly more likely than not to be feasible for Oklahoma and North Dakota. Nebraska projections are less robust to revenue reductions with merely three cycles projected to

Table 9. Sensitivity of Net Cash Flow and Net Return due to Increased Cost for North Dakota

Year	Cost as a Percent of Baseline					
	Baseline (100%)	105%	110%	115%	120%	125%
2003	\$26681	\$22592	\$18502	\$14412	\$10323	\$6233
	\$43646	\$39557	\$35467	\$31377	\$27288	\$23198
2004	\$23057	\$18946	\$14835	\$10724	\$6613	\$2502
	\$38253	\$34142	\$30031	\$25920	\$21809	\$17698
2005	\$21475	\$16546	\$11617	\$6688	\$1759	-\$3170
	\$35627	\$30698	\$25769	\$20840	\$15911	\$10982
2006	-\$5050	-\$9838	-\$14626	-\$19413	-\$24201	-\$28989
	\$7594	\$2806	-\$1982	-\$6769	-\$11557	-\$16345
2007	-\$2351	-\$6808	-\$11265	-\$15722	-\$20179	-\$24636
	\$9742	\$5285	\$828	-\$3629	-\$8086	-\$12543
2008	\$47836	\$44091	\$40345	\$36600	\$32855	\$29110
	\$63003	\$59258	\$55512	\$51767	\$48022	\$44277
2009	\$74350	\$71169	\$67989	\$64808	\$61627	\$58446
	\$92939	\$89758	\$86578	\$83397	\$80216	\$77035
2010	\$71468	\$67514	\$63559	\$59605	\$55651	\$51697
	\$90347	\$86393	\$82438	\$78484	\$74530	\$70576
2011	\$98253	\$93526	\$88799	\$84072	\$79344	\$74617
	\$120351	\$115624	\$110897	\$106170	\$101442	\$96715
2012	\$200796	\$197316	\$193835	\$190354	\$186873	\$183392
	\$237220	\$233740	\$230259	\$226778	\$223297	\$219816
2013	\$91169	\$86189	\$81209	\$76230	\$71250	\$66270
	\$116631	\$111651	\$106671	\$101692	\$96712	\$91732
2014	-\$45521	-\$54560	-\$63600	-\$72640	-\$81680	-\$90719
	-\$30441	-\$39480	-\$48520	-\$57560	-\$66600	-\$75639
2015	\$40024	\$33869	\$27714	\$21560	\$15405	\$9250
	\$59889	\$53734	\$47579	\$41425	\$35270	\$29115
2016	\$73747	\$69378	\$65009	\$60640	\$56271	\$51902
	\$94366	\$89997	\$85628	\$81259	\$76890	\$72521
Cash flow \geq 0	11 years*	11 years	11 years	11 years	11 years	10 years
Net return \geq 0	13 years	13 years	12 years	11 years	11 years	11 years

* Number of years (out of 14 simulated) with positive net cash flow and net returns.

have positive net cash flow and seven cycles showing positive net returns.

Similar results are reported in [Tables 7, 9, and 11](#) with costs increasing in 5% increments. Again, the projected budgets shown are reasonably optimistic for a feasible herd-building strategy in Oklahoma and North Dakota. The results are slightly less sensitive to cost increases than the previous

revenue reductions. Nebraska, while showing less sensitivity to cost increases than revenue declines, still struggles to project positive net cash flow and net returns when costs are 25% higher than baseline values. However, at 20% increase in costs, half of the cycles showed positive net cash flow and slightly more than half (nine out of 14) had nine cycles with positive net returns.

Table 10. Sensitivity of Net Cash Flow and Net Return due to Decreased Revenue for Nebraska

Cycle	Revenue as a Percent of Baseline					
	Baseline (100%)	95%	90%	85%	80%	75%
2003	\$29197	\$22270	\$15343	\$8415	\$1488	-\$5439
	\$44828	\$37119	\$29410	\$21702	\$13993	\$6284
2004	\$8540	\$2170	-\$4200	-\$10570	-\$16941	-\$23311
	\$24055	\$16909	\$9763	\$2617	-\$4529	-\$11674
2005	-\$233	-\$6773	-\$13314	-\$19855	-\$26396	-\$32937
	\$14702	\$7415	\$127	-\$7160	-\$14448	-\$21736
2006	\$1101	-\$4450	-\$10001	-\$15552	-\$21103	-\$26654
	\$14325	\$8113	\$1901	-\$4311	-\$10523	-\$16736
2007	-\$17448	-\$22607	-\$27767	-\$32926	-\$38085	-\$43245
	-\$4601	-\$10403	-\$16204	-\$22006	-\$27808	-\$33609
2008	\$24573	\$17450	\$10327	\$3204	-\$3920	-\$11043
	\$39856	\$31969	\$24081	\$16194	\$8307	\$420
2009	\$52520	\$44421	\$36322	\$28223	\$20124	\$12025
	\$71979	\$62907	\$53835	\$44763	\$35691	\$26619
2010	\$40092	\$31170	\$22248	\$13326	\$4404	-\$4518
	\$59551	\$49656	\$39761	\$29866	\$19972	\$10077
2011	\$38297	\$28086	\$17875	\$7664	-\$2546	-\$12757
	\$61584	\$50208	\$38833	\$27458	\$16083	\$4708
2012	\$126425	\$111678	\$96931	\$82184	\$67437	\$52690
	\$162443	\$145895	\$129347	\$112799	\$96252	\$79704
2013	\$55380	\$43218	\$31056	\$18894	\$6732	-\$5430
	\$83452	\$69886	\$56321	\$42755	\$29190	\$15624
2014	-\$61153	-\$70031	-\$78908	-\$87785	-\$96662	-\$105540
	-\$44188	-\$53914	-\$63639	-\$73365	-\$83090	-\$92816
2015	-\$15232	-\$23691	-\$32151	-\$40610	-\$49070	-\$57529
	\$6605	-\$2946	-\$12497	-\$22049	-\$31600	-\$41151
2016	\$11010	\$2790	-\$5430	-\$13649	-\$21869	-\$30089
	\$32151	\$22874	\$13597	\$4320	-\$4956	-\$14233
Cash flow \geq 0	10 years*	9 years	7 years	7 years	5 years	3 years
Net return \geq 0	12 years	11 years	11 years	9 years	7 years	7 years

*Number of years (out of 14 simulated) with positive net cash flow (top) and net returns (bottom).

CONCLUSIONS

High capital outlays for the purchase of a herd creates an entry barrier for beginning cow-calf producers. This study developed and analyzed a strategy for beginning rancher herd building. Using cash flow budgeting, the baseline model indicated new producers could cash flow a purchase of 100

heifers, breed and calve them, and then rebreed to sell as “twos-coming-threes.” At the end of a 2.5-year production cycle, producers were projected to be debt free and own 29 replacement heifers in most cycles evaluated. High calf prices in fall 2014 were projected to lead to negative net cash flows in the three states. Nebraska producers were also projected to have negative net cash flow in the

Table 11. Sensitivity of Net Cash Flow and Net Return due to Increased Cost for Nebraska

Year	Cost as Percent of Baseline					
	Baseline (100%)	105%	110%	115%	120%	125%
2003	29197	23730	18262	12795	7327	1860
	44828	39361	33893	28426	22958	17491
2004	8540	2597	-3346	-9289	-15233	-21176
	24055	18112	12169	6226	282	-5661
2005	-233	-6785	-13338	-19890	-26443	-32995
	14702	8150	1597	-4955	-11508	-18060
2006	1101	-4395	-9891	-15386	-20882	-26378
	14325	8829	3333	-2162	-7658	-13154
2007	-17448	-23480	-29512	-35543	-41575	-47607
	-4601	-10633	-16665	-22696	-28728	-34760
2008	24573	18679	12784	6890	995	-4899
	39856	33962	28067	2173	16278	10384
2009	52520	47047	41574	36101	30628	25155
	71979	66506	61033	55560	50087	44614
2010	40092	33175	26257	19340	12423	5505
	59551	52634	45716	38799	31882	24964
2011	38297	30001	21705	13409	5113	-3183
	61584	53288	44992	36696	28400	20104
2012	126425	117999	109574	101148	92722	84296
	162443	154017	145592	137166	128740	120314
2013	55380	45987	36594	27201	17808	8415
	83452	74059	64666	55273	45880	36487
2014	-61153	-73088	-85023	-96958	-108893	-120828
	-44188	-56123	-68058	-79993	-91928	-103863
2015	-15232	-24453	-33674	-42895	-52116	-61337
	6605	-2616	-11837	-21058	-30279	-39500
2016	11010	3341	-4329	-11998	-19667	-27337
	32151	24482	16812	9143	1474	-6196
Cash flow \geq 0	10 years*	9 years	7 years	7 years	7 years	5 years
Net return \geq 0	12 years	11 years	11 years	9 years	9 years	7 years

*Number of years (out of 14 simulated) with positive net cash flow and net returns.

cycles beginning in 2005 and 2007 primarily due to higher pasture rental rates than in Oklahoma and North Dakota. However, baseline cash flow budgets are positive in most of the cycles for the three states.

The results from the multiyear cash flow projections for herd building are encouraging. Regardless of state or year, building a herd for a first-time producer seems financially feasible except when feeder cattle prices spike. It should be noted that

producers do incur operating debt under this strategy. However, throughout the 27 months that our scenario covers, producers pay down part of their expenses through selling cull heifers, steer calves, and open cows.

New or young producers find building a cow herd financially challenging. For producers considering building a herd, this analysis provides a framework analyzing financial feasibility. These results may provide guidance to policy makers

seeking avenues to assist new producers. Several programs are available to assist new producers overcome the financial challenges associated with farm startups. Subsidized loan programs may need modification to fit the proposed strategy but it appears that repayment is likely. Overall, this study concludes that allowing first-time producers to finance the initial purchase of heifers and a portion of the subsequent operating cost can lead to positive net cash flows for producers and the establishment of a breeding herd.

NOTES

1. We assumed that 30% of the heifer crop is not suitable for retention as breeding stock due to phenotype, temperament, etc.

2. A rebred cow between two and three years of age is called a “two-coming-three” in the trade.

3. This market price likely understates the market value of cows of this age as they are under 30 months of age, called “heiferettes,” and so qualify as Maturity A beef (Hale et al., 2013).

4. This is also a conservative assumption. Many of these “open” cows are bred late and would still sell as bred cows, thus earning a higher sale price.

5. Net cash flow can be improved in all scenarios by decreasing the percent of heifers retained. So, net return is the upper limit of net cash flow.

REFERENCES

- Ackoff, S., Bahrenburg, A., & Shute, L. L. (2017). Building a future with farmers: Results and recommendations from the National Young Farmer Survey. <https://www.youngfarmers.org/wp-content/uploads/2018/02/NYFC-Report-2017.pdf>
- Ahearn, M. C. (2011). Potential challenges for beginning farmers and ranchers. <https://www.choicesmagazine.org/choices-magazine/theme-articles/innovations-to-support-beginning-farmers-and-ranchers/potential-challenges-for-beginning-farmers-and-ranchers>
- Bierlen, R., Dixon, B. L., Ahrendsen, B. L., & Barry, P. J. (1998). Credit constraints, farm characteristics, and the farm economy: Differential impacts on feeder cattle and beef cow inventories. *American Journal of Agricultural Economics*, 80(4), 708–723.
- Doye, D., Kletke, D. & Fischer, B (2002). Oklahoma pasture rental rates, 2002–2003. Current Report CR-216. Oklahoma Cooperative Extension Service, Stillwater.
- Doye, D., & Sahs, R. (2004). Oklahoma pasture rental rates, 2004–2005. Current Report CR-216. Oklahoma Cooperative Extension Service, Stillwater.
- Doye, D., & Sahs, R. (2006). Oklahoma pasture rental rates, 2006–2007. Current Report CR-216. Oklahoma Cooperative Extension Service, Stillwater.
- Doye, D., & Sahs, R. (2008). Oklahoma pasture rental rates, 2008–2009. Current Report CR-216. Oklahoma Cooperative Extension Service, Stillwater.
- Doye, D., & Sahs, R. (2010). Oklahoma pasture rental rates, 2010–2011. Current Report CR-216. Oklahoma Cooperative Extension Service, Stillwater.
- Doye, D., & Sahs, R. (2012). Oklahoma pasture rental rates, 2012–2013. Current Report CR-216. Oklahoma Cooperative Extension Service, Stillwater.
- Doye, D., & Sahs, R. (2014). Oklahoma pasture rental rates, 2014–2015. Current Report CR-216. Oklahoma Cooperative Extension Service, Stillwater.
- Doye, D., & Sahs, R. (2016). Oklahoma pasture rental rates, 2016–2017. Current Report CR-216. Oklahoma Cooperative Extension Service, Stillwater.
- Doye, D., Sahs, R., Peel, D., & DeVuyst, E. A. (2013). Financing herd rebuilding after the 2011 drought. *Journal of the American Society of Farm Managers and Rural Appraisers*, 76(1), 1–8.
- Hale, D. S., Goodson, K., & Savell, J. W. (2013.) USDA beef quality and yield grades. <https://meat.tamu.edu/beefgrading/>. Accessed April 2, 2021.
- Jansen, J., & Stokes, J. (2018). Nebraska farm real estate market highlights. Department of Agricultural Economics University of Nebraska–Lincoln.
- Katchova, A. L., & Dinterman, R. (2018). Evaluating financial stress and performance of beginning farmers during the agricultural downturn. *Agricultural Finance Review*, 78(4), 457–469.
- Livestock Marketing Information Center. (2021). Cull cow prices. <https://www.lmic.info/members-only/SpreadSheets/Cattle/FeederPrices> Accessed April 5, 2021.
- Manning, L. (2019). Beginning farmers identify three barriers. <https://www.agriculture.com/news/business/barriers-for-beginning-farmers>
- Nerhing, R., Gillespie, J., Hallahan, C., Michael Harris, J., & Erickson, K. (2014). What is driving economic and financial success of US cow-calf operations? *Agricultural Finance Review*, 74, 311–325.
- North Dakota Career and Technical Education. (2021). North Dakota farm business management education annual reports. <https://www.ndfarmmanagement.com/reports.html>. Accessed April 2, 2021.
- Oklahoma State University. (2017). Cowculator 2.0. <http://oqbn.okstate.edu/calculators>. Accessed April 2, 2021.
- Sahs, R. (2018). Oklahoma pasture rental rates, 2018–2019. Current Report CR-216. Oklahoma Cooperative Extension Service, Stillwater.
- Trejo-Pech, C. J. O., Bruhin, J., Boyer, C. N., & Smith, S. A. (2021). Profitability, risk and cash flow

- deficit for beginning cow-calf producers. *Agricultural Finance Review*, forthcoming.
- USDA. (n.d.a). Beginning farmer and rancher development program. Accessed March 25, 2021. <https://nifa.usda.gov/program/beginning-farmer-and-rancher-development-program-bfrdp>
- USDA-ERS. (n.d.c) Agriculture Improvement Act of 2018. Last modified October 1, 2019. <https://www.ers.usda.gov/agriculture-improvement-act-of-2018-highlights-and-implications/>
- USDA-ERS. (2013). Beginning farmers and ranchers at a glance. https://www.ers.usda.gov/webdocs/publications/42874/34829_eb-22.pdf?v=0
- USDA-NASS. (n.d.d). Oklahoma monthly hay prices received per ton, 2003–2019. Accessed March 25, 2021. <https://quickstats.nass.usda.gov/results/C3CB BB2F-5B09-3A85-9DD8-6D6117E39A92>
- USDA-NASS. (n.d.e). Nebraska monthly hay prices received per ton, 2003–2019. Accessed March 25, 2021. <https://quickstats.nass.usda.gov/results/55096 C7A-5DC6-309B-A110-72820228395E>
- USDA-NASS. (n.d.f). North Dakota monthly hay prices received per ton, 2003–2019. Accessed March 25, 2021. <https://quickstats.nass.usda.gov/results/B0954 77D-C7D4-3BF4-9551-7EA988E4D596>
- USDA-NASS. (n.d.g). North Dakota yearly rent for pastureland, 2003–2019. Accessed March 25, 2021. <https://quickstats.nass.usda.gov/results/351DDA92 -0D9C-3995-8E68-8F84AF6B894C>
- USDA-NRCS. (n.d.b). Environmental quality incentives program. Accessed March 25, 2021. <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/>