



FARM Assistance

Focus

TEXAS A&M
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EXTENSION



Profitability of Beef Cattle Best
Management Practices in South Texas:
Conversion from Bred Cows to
Heifers for Replacements

Mac Young
Joe Paschal
Steven Klose
Greg Kaase

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Department of Agricultural Economics,
Texas AgriLife Extension Service
Texas A&M University System
farmassistance.tamu.edu

Raising or purchasing replacement heifers requires significant investment in their development before any return is possible.

Deciding where and how to find your replacement females is one of the most important and risk laden business decisions ranchers make. Whether to raise or purchase replacements is one of the most often asked questions of Extension personnel. Many producers raise their own replacement females without considering the cost of doing so in terms of lost production of calves and time and management involved.

Gill et al (1994) considered the genetic, economic and management factors that might be involved in selecting replacement females using 16 different alternatives, including retaining ranch raised heifers. The factors considered included available quality and quantity, initial investment expense, development phase (to bring the female into production), rebreeding potential, flexibility in marketing extras or cull replacements, genetic potential, longevity, dystocia and death loss, weaning weight of calves, nutrient requirements, and culling rate. The 15 alternatives (in addition to “ranch raised”) were divided into four age groups and three or four reproductive classes. The alternatives were: heifers (open heifers under 700 lbs., open heifers over 700 lbs., and bred heifers), two-year olds (first calf pairs, three-in-ones, and opens), three to six year old (bred cows, pairs, three-in-ones, and opens), and seven years and older (bred cows, pairs, three-in-ones, and opens). Stocker cows, thin cows of unknown age or pregnancy status were also included.

In general, the availability of quality and quantity of females were considered highest for all heifer classes and moderate for most cow classes. Initial investment was highest for the two year and three-six-year olds and lowest for open heifers and older cows. Development phase was longest for the heifers, moderate for the open classes, and lowest in all others. Rebreeding potential was highest for the younger cows and lowest for the heifers. Flexibility in marketing extras was highest for the heifers, moderate for the oldest cows, and lowest for all other classes. Genetic potential was highest for the ranch raised and lightest heifer class and lowest for the heaviest heifer class and moderate for all the other replacement classes considered. Potential longevity reflected age at replacement with younger females having greater longevity than older ones. Younger females, particularly heifers and first calf pairs had the highest dystocia and death loss while the older cows were generally lower. Weaning weights were lower for heifers than for older cows. Nutrient requirements were higher from younger than for older cows in all reproductive classes. Cull rate was also highest for the younger females compared to the older cows.

Results indicate that raising or purchasing replacement heifers requires significant investment in their development before any return is possible. Although heifers (raised or purchased) are generally higher in availability, marketing flexibility, genetic potential, and longevity, they are also higher for dystocia and death loss, nutrient requirements, and have lower rebreeding potential and weaning weight which affect profitability. Cattle producers need to determine their costs of production and look at several options each year. The results from one year may be different from past or future years and in some instance, more than one option may be considered based on economic analyses and careful consideration of these variables.

Based on Gill et al (1994), cow-calf producers have many options when increasing herds or replacing cows culled. The method used may be influenced by market prices, availability of quality replacements, and the desire to improve or change the genetics of the herd. Cows normally do not require additional development costs, but heifers do, and bred females (cows and calves) provide a quicker return on investment, which could also be factors to consider. Successful managers will select and/or retain high quality replacements with good genetics to improve overall herd performance and profitability.

“Best management practices,” such as selection or retention of high-quality female replacements are proven methods for improving overall herd performance and ranching profitability. The purpose of this study is to analyze similar replacement decisions under current cost structure and market outlook. This study illustrates the financial implications of changing female replacement strategies from bred cows to bred heifers, open heifers, or raising heifers on herd performance and profitability of commercial South Texas ranching operations.

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Assumptions

The Financial And Risk Management (FARM) Assistance strategic planning model was used to illustrate the individual financial impacts of herd replacements by South Texas ranchers. Four scenarios were evaluated: 1) young bred cows; 2) bred heifers; 3) buying open heifers; and 4) raising replacement heifers.

The 2,000-acre ranch in this model consists of 1,800 acres of native pasture and 200 acres of established Coastal Bermuda used for grazing only. Under normal stocking conditions, the cow herd includes 200 cows (1 animal unit to 10-acre stocking rate) and 8 bulls (1 bull to 25 cows). It is assumed the operation normally replaces females with bred cows, And, the carrying capacity of the ranch is limited to 200 animal units, including both cows and any replacement heifers. The operation calves in the spring, and pregnancy checks and cull cows in the fall.

The general assumptions are given in Table 1. Production inputs, costs, and estimates for overhead charges were based on typical rates for the region. In 2019, the income from hunting was \$10/acre. The assets, debts, machinery inventory, and scheduled equipment replacements for the projection period were the same in all management scenarios. It is assumed the ranch has only intermediate term debt. Cattle prices used were from the Live Oak Livestock Commission Company auction report in Three Rivers, Texas, for February 25, 2019.

Calving rates, weaning weights, and death loss assumptions in the scenarios were expected to vary for cows and heifers based on research conducted by Texas A&M AgriLife Research and Extension and others. Table 2 lists the specific assumptions for calving rates, weaning weights and development costs for heifers. Calving rates average 90% for cows and 80% for first-time heifers. The “blended” calving rate is 88% (heifers account for 20% of females calving) in the three heifer scenarios. Weaning weights are based on an annual mix of cows and heifers assuming first-time heifers normally have lighter weights calves. First year heifer calf weaning weights were reduced 50 lbs. and second year 25 lbs. per calf. Bred heifers were assumed to require 12 months of development costs, purchased open heifers 18 months, and raised heifers 25 months. It was also assumed that reproductive management (pregnancy testing all cows, BSE testing for bulls and vaccinations for reproductive and other diseases) and calf management (clostridial vaccinations, castration, and growth

Table 1: 2019 General Assumptions, South Texas Representative Ranch

Selected Parameter	Assumptions
Operator Off-Farm Income	\$50,000/year
Spouse Off-Farm Income	\$35,000/year
Family Living Expense	\$50,000/year
Native Pasture	1,800 acres
Improved Pasture (Bermuda)	200 acres
Ownership Tenure	100%
Royalty Income	Not Included
Hunting Income	\$10/acre
Herbicide/Acre (Native Pasture)	\$0.90
Herbicide/Acre (Bermuda)	\$12.00
Fertilizer/Acre (Bermuda only)	\$30.00
Number of Cows	200
Number of Bulls	8
Cow Herd Replacement	Bred cows
Vet, Medicine & Supplies	\$34.34/cow
Salt/Mineral blocks/Year	\$23.60/cow
Hay Fed/Cow/Year	1.5 tons
Protein Cubes Fed/Cow/Year	200 lbs.
Cow Culling Rate/Year	10%
Steer Prices	\$1.50/lb.
Heifer Prices	\$1.40/lb.
Cull Cow Price	\$.64/lb.
Cull Bull Price	\$.80/lb.
Bred Cow Price	\$1,200/head
Bred Heifer Price	\$1,000/head
Open Heifer Price	\$800/head
Replacement Bull Prices/Head	\$3,000
Hay Price	\$100/ton
Bulk Range Cube Price	\$.15/lb.
Pregnancy Testing	\$7.50/cow
BSE Testing	\$42.50/bull
Clostridial Vaccination	\$1.16/calf
Castration & Growth Implants	\$1.97/calf
Deworming Injection (Calf/Cow)	\$1.81/\$3.96
Reproductive Vaccines	\$3.12/cow
Extra Day Labor/Calf Practice	\$2/calf

Heifer development costs, lower calving and weaning rates, and reduced weaning weights may be limiting factors.

implants) and deworming all cattle and calves was practiced by the producer.

The first year for the 10-year analysis of the representative ranch is 2019 and projections are carried through 2028. The projections for commodity and livestock price trends follow projections provided by the Food and Agricultural Policy Research Institute (FAPRI, University of Missouri) with costs adjusted for inflation over the planning horizon. Profitability and liquidity were measures chosen to assess the financial implications of each scenario. Profitability measures the extent to which a farm or ranch generates income from the use of its resources. Net cash farm income (NCFI) was used to measure profitability. It includes the purchase and sale of breeding livestock but does not include non-cash items such as depreciation. Liquidity measures the ability of a farm or ranch to meet its short-term financial obligations without disrupting the normal operations of the business. The liquidity of the operation may be measured by the ending cash balance net of taxes. Both measures provide information with respect to the projected variability in the ranch's financial position and performance expectations of the ranch throughout the 10-year planning horizon under replacement scenario.

Table 2: 2019-2028 Specific Assumptions, South Texas Representative Ranch					
Selected Parameter	Replacement Scenarios	Assumptions Per Year			
		2019	2020	2021	2022-2028
Calving Rate	Bred Cows	90%			
	Bred Heifers	90%	88%		
	Buy Open Heifers	90%		88%	
	Raise Heifers	90%		88%	
Bull Calves Weaning Weights (lbs.)	Bred Cows	525			
	Bred Heifers	525	520	518	
	Buy Open Heifers	525	525	520	518
	Raise Heifers	525	525	520	518
Heifer Calves Weaning Weights (lbs.)	Bred Cows	475			
	Bred Heifers	475	470	468	
	Buy Open Heifers	475	475	470	468
	Raise Heifers	475	475	470	468
Development Costs	Bred Cows	\$0			
	Bred Heifers	\$730			
	Buy Open Heifers	\$730	\$1,090		
	Raise Heifers	\$730	\$1,460	\$1,520	

Results

Financial projections for each replacement practice are given in Table 3. These results represent the average outcomes for net cash farm income and cash flow projections for 2019-2028. Figure 1 illustrates the range of possibilities comparing bred cows as replacements to bred, open, or raised heifers. The dip in NCFI in 2020 for all four scenarios partially reflects the low price point in the cattle cycle. However, since the open heifer scenario had no calves to sell from the heifers in 2020, the drop was much greater. It should be noted that off-farm income and hunting contribute somewhat to the cash flow of the ranching business in all scenarios. The operation begins the first year in each scenario with a total cash balance of \$10,000, and if profitable, accumulates cash over the 10-year period.

All four replacement scenarios offer the potential to generate profitability in the cow-calf operation (Table 3 and Figure 1). Purchasing young bred cows for replacement (Scenario 1) had the highest average net cash farm income (NCFI) at \$34,780/year or \$173.90/cow unit/year and \$193.22/calf/year. Average cash reserves, at the end of the 10-year projections for Scenario 1 was \$2,478.25/cow unit, reflecting the cost of purchasing bred cows.

The best option may not be the least expensive upfront. A combination of options is often the best and may change from year to year.

Buying bred heifers (Scenario 2) has a slightly lower potential for improving profitability and financial performance (Table 3 and Figure 1). NCFI averages \$32,190/year over the 10-year projection, 7.4% less than the bred cow Scenario 1. Average net returns equate to \$160.95/cow unit, \$12.95/cow unit less than Scenario 1. Returns per calf were \$184.58/calf, a decrease of \$8.64/calf. The drop in NCFI with bred heifers is largely due to lower average calving rates and calf weaning weights plus heifer development costs overriding lower cash outlays for replacement purchases. Cash reserves at the end of the 10-year period are \$2,418.95/cow unit, 2.4% less than Scenario 1.

Buying open heifers (Scenario 3) resulted in the lowest projected profitability. NCFI averages \$32,020/year, 7.9% less than Scenario 1 (Table 3 and Figure 1). This primarily shows the economic impact of buying lower cost heifers as replacements, higher development costs, fewer calves in 2020, and an estimated 80% weaning rate from the first-year heifers. And, with 2019 being a transition year, it was assumed that a normal 90% calf crop would occur and heifers would be purchased to replace cull cows. The operation essentially changes from 200 cow units to 180 cows plus 20 non-pregnant replacements. Average net returns are \$160.10/cow unit, \$13.80/cow unit less than replacing with bred cows. Ending cash reserves decline by only .9%.

The last scenario analyzes transitioning to raising replacement heifers. In comparison to Scenario 1, NCFI decreased by 6% to \$32,710 (Table 3 and Figure 1). This largely reflects heifer development costs, fewer calves in 2020, and an 80% weaning rate for first-year heifer. As in Scenario 3, the operation changes from 200 cow units to 180 cows plus 20 replacements. NCFI averages \$163.55/cow unit, 6% or \$10.35/cow unit less than Scenario 1. Ending cash reserves increases by \$96.80/cow unit or 3.9%. The increase in cash reserves mainly is the result of not purchasing higher cost replacements.

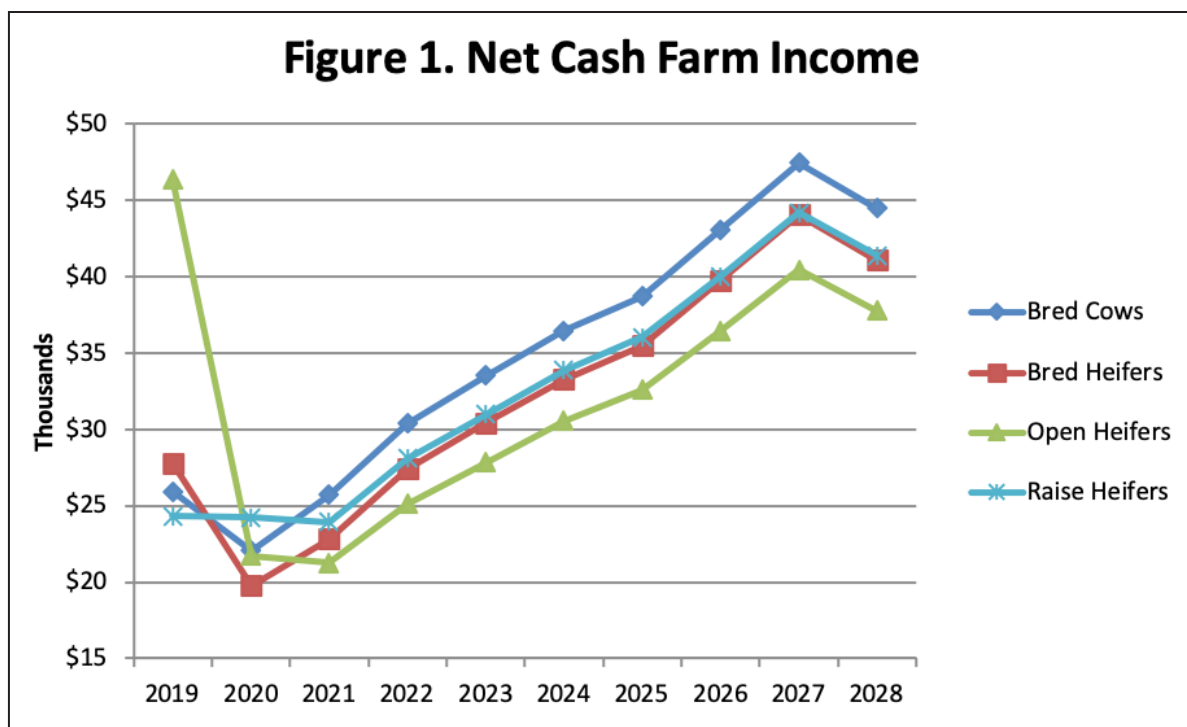
Table 3: 10-Year Average Financial Indicators for a South Texas Representative Ranch, 200-Cow Unit

Scenario		10-Year Average Per Year					Cumulative 10-Yr Cash Flow/ Cow-Unit (\$1000)
		Total Cash Receipts (\$1000)	Total Cash Costs (\$1000)	Net Cash Farm Income (\$1000)	Net Cash Farm Income/ Cow-Unit (\$1000)	Net Cash Farm Income/ Calf (\$1000)	
1	Bred Cows	190.05	155.26	34.78	0.17390	0.19322	2.47825
2	Buy Bred Heifers	184.32	152.13	32.19	0.16095	0.18458	2.41895
3	Buy Open Heifers	172.13	140.11	32.02	0.16010	0.20189	2.45705
4	Raise Heifers	156.39	123.68	32.71	0.16355	0.20624	2.57505

Implications

Changing female replacement strategy from bred cows to raising or purchasing open or bred heifers will impact overall herd performance and bottom-line profits. Heifer development costs, lower calving and weaning rates, and reduced weaning weights may be limiting factors. Bull rotation or management will also be critical in heifer replacement scenarios. All four replacement strategies (young bred cows, bred heifers, open heifers, and raising

If grazing capacity is limited to a set number of cow units and acquiring additional land is not possible, maintaining a heifer replacement herd may not be a viable option.



open heifers) offer a producer the opportunity to improve herd genetics. However, market prices, availability, and quality of replacements will be key issues affecting purchase decisions and in maintaining a set strategy over time. Labor, time management, and producer preference in replacing females could also impact buying decisions.

It should be noted that the best option may not be the least expensive upfront. A combination of options is often the best and may change from year to year.

Carrying capacity or forage availability for grazing may also be a factor in maintaining a heifer replacement herd. If grazing capacity is limited to a set number of cow units and acquiring additional land is not possible, maintaining a heifer replacement herd may not be a viable option. Additionally, off-farm income, hunting, and other income sources will continue to help sustain cattle operations and impact replacement decisions.

Actual results will likely vary by producer, replacement options, production region, and cattle markets. Cow-calf producers should continue to implement best replacement selection and other management practices that improve the bottom-line and financial performance of their operation.

Reference

Gill, R., S. Bevers, and W. Pinchak (1994). Evaluating Replacement Female Alternatives. Cattleman's Magazine. December 1994, Vol. 81, No. 7, Pages 10-16.