



FARM Assistance

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Economic Impact of Beef Cattle Best Management Practices in South Texas: Artificial Insemination

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FARM Assistance Focus 2009-8
September 2009

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“Best management practices” describes a wide array of strategies to improve herd performance and ranching profitability.

South Texas cow-calf operations are continuously confronted with weather and economic issues that impact bottom-line profits and long-term viability. Weather, cattle markets, and increasing operating costs impact profitability and financial condition. Off-farm income and wildlife management are often necessary to sustain ranching operations. Practical managers should continually evaluate operations and implement new management strategies to increase long-term profitability and equity growth.

“Best management practices” describes a wide array of strategies to improve herd performance and ranching profitability. These may include changes to stocking rate, culling, pregnancy testing, BSE testing, supplemental feeding, breeds, herd mix, type of livestock enterprises, hay testing, and artificial insemination (AI). This study illustrates the financial implications of the use of AI on a typical South Texas ranching operation.

Assumptions

The Financial And Risk Management (FARM) Assistance strategic planning model was used to evaluate and illustrate the individual financial impacts of using artificial insemination compared to the status quo on a model South Texas commercial ranch. The ranch is assumed to be 2,000 acres with 200 cows (1 animal unit to 10-acre stocking rate) and 8 bulls (1 bull to 25 cows). The general assumptions and characteristics are given in Table 1. Production inputs, yields, costs, and estimates for overhead charges were based on typical rates for the region. Hunting income was \$7/acre in 2009.

The assets, debts, machinery inventory, and scheduled equipment replacements for the projection period were the same in both scenarios. It is assumed the ranch has only intermediate term debt. Initial, local cattle prices were obtained from the Live Oak Livestock Commission Company auction report in Three Rivers, Texas, for May 4, 2009.

Specific assumptions were made in each scenario. A typical ranch was assumed to have a 95% calving rate if it pregnancy tested cows and BSE tested bulls. The average cost of pregnancy testing was \$6.20/cow or \$1,240/year, which includes a vet ranch visit expense and per head charge. The average cost of BSE was \$57.63/bull or \$461/year.

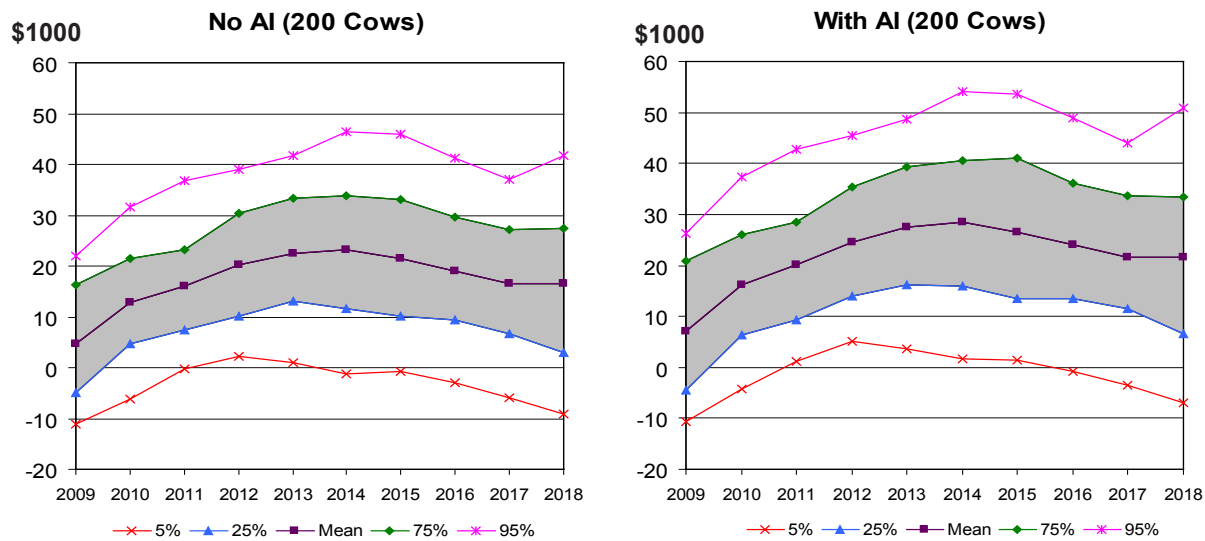
The goal of artificial insemination (AI) is to allow ranchers to breed their cows to bulls with superior genetics for desired traits. It is generally used more by purebred herds (10%) than by commercial producers (3%). In addition, it allows ranchers to reduce the number of bulls used. In this example, the number was reduced by half, from 8 to 4 head.

AI should be used with estrus synchronization for optimal AI success. A benefit of estrus synchronization (ES), used with AI, is having all of the cows come into heat in a short (48-72 hr) period of time, thus allowing for a shortened calving season with heavier calves weaned due to age.

Table 1: 2009 Assumptions for 200-Cow South Texas Representative Commercial Ranch

Selected Parameter	No AI	With AI
Operator Off-Farm Income	\$24,000/year	
Spouse Off-Farm Income	\$35,000/year	
Family Living Expense	\$30,000/year	
Ownership Tenure	100%	
Ranch Size	2000 acres	
Royalty Income	Not Included	
Hunting Income	\$7/acre	
Herbicide Costs/Acre	\$1.50	
Part-Time Labor	\$2,400/yr	\$2,850/yr
Number of Bulls (200 Cows)	8 bulls	4 bulls
Cow Herd Replacement	Bred cows	
Vet, Medicine & Supplies	\$25/cow	
Salt/Mineral Blocks/Year	\$20/cow	
Hay Fed/Cow/Year	1.5 tons	
Protein Cubes Fed/Cow/Year	150 lbs.	
Cow Culling Rate/Year	7.5%	
Calving Rate	95%	
Bull/Steer Weaning Weights	525 lbs.	575 lbs.
Heifer Weaning Weights	475 lbs	525 lbs.
Steer Prices	\$1.08/lb.	
Heifer Prices	\$.98/lb.	
Cull Cow Prices	\$.50/lb.	
Cull Bull Price	\$.62/lb.	
Bred Cow Prices	\$1,100/head	
Replacement Bull Prices	\$2,300/head	
Hay Prices	\$135/ton	
Range Cube Prices	\$0.18/lb.	
Pregnancy Testing	\$6.20/cow	
BSE Testing	\$57.63/bull	
Synchronization Shot	N/A	\$15/cow
Vet or Technician Fee & Semen	N/A	\$26/cow

Figure 1: Projected Variability in Net Cash Farm Income



The AI/ES procedure is a three step process that can be preformed by an AI technician or a trained rancher. The first step is the administration of a synchronization product (in this example an EAZY Breed CIDR, a vaginal insert, which is placed into the cows reproductive tract) and a gonatropin releasing hormone injection at insertion of the CIDR. The second step is a prostaglandin injection at removal of the CIDR seven days later. The third step is inseminating the cow with a single dose of semen between 66 and 72 hours after the removal of the CIDR. In this scenario, the synchronization cost is estimated at \$15 per cow or \$3,000 total. The average AI cost is \$26 per cow or \$5,200 total, including AI technician cost. The assumption is made that 50% or 100 of the cows will be bred through AI and the remaining cows will be covered by the 4 clean-up bulls.

In the analysis, the ranch was allotted \$2,400 for assorted day labor costs. The use of AI will increase day labor because the cattle will need to be handled

more times. It was assumed that 4 people are needed for the AI process. The vet or technician will need to be present at breeding, the owner of the cattle, and 2 extra day laborers at \$75 per hand per day or \$450. Any decrease in the amount of day labor used in the ES and AI process will reduce cost.

Based on previous research, it is assumed that AI can improve the genetics of the cow herd by using semen from sires that have the desired traits in the breed. Estrus synchronization will also shorten the length of the calving season and increase weaning weights. AI will result in 50% of the calves being born within the first week of the calving season. All calves are born within 60 days. Even though 50% of the calves are

born after the first week, they will still gain more on average than calves from cows not subjected to estrus synchronization. In a shorter calving season, calves will have more time to gain weight and be heavier on average at weaning. It is assumed that a 50-pound increase in average weaning weights will occur (Table 1).

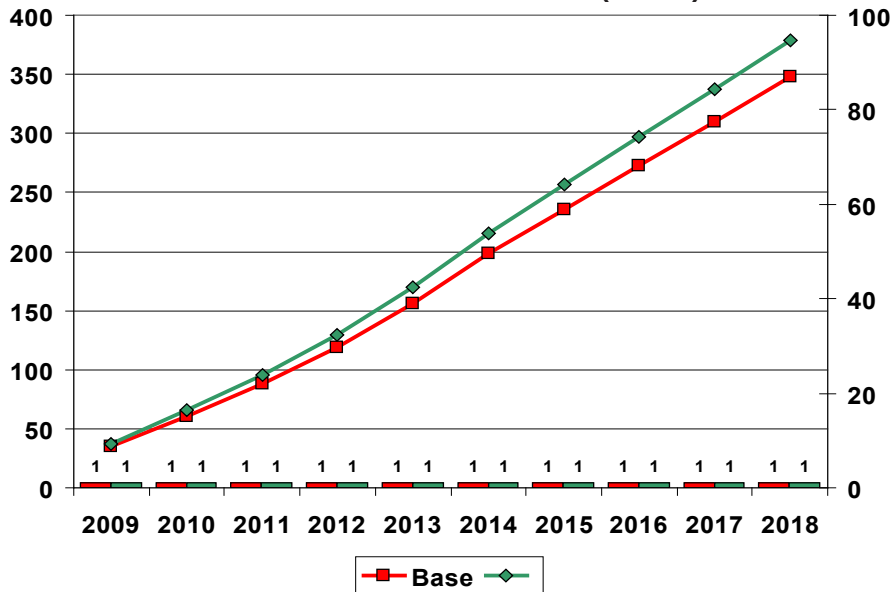
The base year for the 10-year analysis of the representative ranch is 2009 and projections are carried through 2018. Commodity and livestock price trends follow projections provided by the Food and Agricultural Policy Research Institute (FAPRI, University of Missouri) with costs adjusted for inflation over the planning horizon. Representative measures, including profitability

Table 2: Projected Annual Financial indicators (2009-2018)

Scenario	10-Year Averages				Cumulative 10-Yr Cash Flow/Cow (\$1000)
	Total Cash Receipts (\$1000)	Total Cash Costs (\$1000)	Net Cash Farm Income (\$1000)	Net Cash Farm Income/Cow (\$1000)	
No AI	143.01	125.69	17.32	0.09	1.738
AI	153.31	131.52	21.78	0.11	1.894

The use of artificial insemination, by improving genetics, reducing the calving period, and increasing calf weaning weights, may offer opportunities to improve a ranch's bottom line and financial position.

Figure 2: Ending Cash Reserves and Probability of Having to Refinance Operation Note for No Artificial Insemination (Red) and Artificial Insemination (Green)



and liquidity were 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) is one measure of profitability. 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. Each measure provides information with respect to the projected variability in the ranch's financial position and performance. When taken as a whole, the analysis provides insight into the risk and return expectations of the ranch throughout the planning horizon under each management practice.

Results

Comprehensive financial projections, including price and weaning weight risk with and without AI, are illustrated in Table 2 and Figures 1 and 2. Table 2 presents the average outcomes for selected financial projections, while the graphical presentations illustrate the range of possibilities for the selected variable.

AI offers the potential to significantly impact profitability and financial performance of a cow-calf operation (Table 2 and Figure 1). Without AI, net cash farm income (NCFI) averages \$17,320 per year for the operation or approximately \$86.60/cow/year. With AI, NCFI averages \$21,780 or about \$108.95/cow per year. Comparing not using AI to the

use of AI, this is a net increase in NCFI of about \$22.35/cow per year.

Liquidity, or average cash reserves, at the end of the 10-year projection improves by almost \$160/cow with AI (Table 2 and Figure 2). It is worth noting that off-farm income contributes somewhat to the cash flow of the ranching business; however, this effect is present in both scenarios.

Implications

The financial performance and condition of the typical South Texas cow-calf operation is often enhanced by off-farm employment, hunting and other income sources. Implementing best management practices offer a cow-calf-producer the potential to improve herd performance and profitability. Actual results will likely vary by producer, cow pregnancy testing, BSE testing and culling infertile bulls, and differences in actual conception rate to AI. The use of artificial insemination, by improving genetics, reducing the calving period, and increasing calf weaning weights, may offer opportunities to improve a ranch's bottom line and financial position. A prudent manager will study and implement practices that best fit his or her management style and operation.

Acknowledgement

Appreciation is expressed to Dr. Charles Looney for his input and advisory contributions to this project.

Produced by FARM Assistance, Texas AgriLife Extension Service,
The Texas A&M University System

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