

Practices to Improve Beef Cattle Efficiency

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Cattle producers share a common goal – **improve the efficiency and profitability of their ranch**. Efficiency is a term used to describe producing a product with the least amount of waste. Waste on beef cattle ranches typically involves waste of time, labor, financial resources and natural resources. To become more efficient, beef cattle producers must measure both inputs and outputs of the different resources involved in beef production operations.

In 1992, the University of Arkansas Cooperative Extension Service implemented the Arkansas Beef Improvement Program (ABIP). The goal of the program was to demonstrate cost-effective management practices designed to increase efficiency and profitability of beef cattle production.

This publication addresses 10 management practices used on ABIP farms. These practices are defining goals, soil testing, inventorying pastures, forage testing/least-cost supplemental feeding, mineral supplementation, stockpiling forages, controlled breeding season, cow herd performance testing, cow-calf enterprise budgeting and production calendar development. The first step toward a more efficient operation is sound business decisions resulting from these management practices.

Goal Setting

Why do I own or operate a ranch? is the first question in determining ranch goals. Goals identify where a

producer wants the ranch to be in 5, 10 or 15 years. Long-term goal setting is an important practice because it defines the path toward ranch success. **Ranch goals should be SMART – Specific, Measurable, Attainable, Related and Trackable.**

Selecting achievable goals is the first step toward successful ranching. A rancher can be successful at raising cattle but lose the ranch. Most ranchers are not interested in maximizing profit; instead, they want to maintain ranch ownership, make some ranch improvements and enjoy the ranching lifestyle. Goals must be carefully developed and prioritized. Successful ranching is making the right choices based on careful planning aimed at achieving ranch goals under expected future conditions.

Goal setting should involve everyone actively involved in the business. Once the goals of the ranch are determined, they need to be written down and placed somewhere visible, such as a bulletin board or refrigerator door.

Soil Testing

Each year, hay meadows are fertilized to improve yield and forage quality. Fertilizing without a soil analysis can be expensive and wasteful. A soil test analysis is a service available through the local county Extension office. A soil test generally involves taking 15 to 20 core samples (6 inches deep) per field.

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A soil test analysis report provides the pounds per acre of nutrients in the soil along with a fertilization recommendation. The fertilization recommendation is based on the forage species being established or maintained and desired production level.

In 1997, one ABIP producer noticed a decline in bermudagrass hay yields. A review of the 1996 soil test report indicated the potassium level was 157 pounds per acre, which was below the requirement (> 200 pounds per acre) for the level of production desired. Haying removed more potassium than was being reapplied to the field. Fertilization practices were changed, resulting in higher soil test potassium in 1998 (235 pounds per acre) and 1999 (222 pounds per acre). Without a soil test, the wrong type or insufficient amount of fertilizer might have been applied and yields would not have improved.

Replacing soil nutrients is too expensive for guesswork. As a result of a soil test, the correct fertilizer can be applied to match the desired level of production. Soil testing resulted in both improved forage production and sound soil nutrient management.

Field Inventories

The **field inventory** is a tool used to identify the predominant forage and weed species in a field, along with the amount of open ground. Field inventories on ABIP farms are taken once or twice a year depending on the amount of warm-season and cool-season grasses in the field. Field inventories can aid management decisions regarding weed control or fertilization timing to promote one type of grass over another. The inventories can also help monitor changes in the field due to grazing pressure and weather conditions, such as a summer drought.

A quick-and-easy method to inventory a field is a walking transect. Every third or fourth step, record the plant species or open ground at the point of the shoe. Take 75 to 100 points along the transect and determine the percentage for each species or open ground. Percentages can be assembled into broader categories, such as warm-season grasses, cool-season grasses, legumes, broadleaf weeds, grassy weeds and open ground.

On one ABIP pasture, a forage inventory revealed 8 percent grass and 43 percent broadleaf weeds. A general rule of thumb is to control broadleaf weeds once they represent 20 percent or more of the plant population in a field. A weed control program was implemented, and within four years, the weeds were reduced to 11 percent of the field inventory and grass increased to 45 percent. The remaining 44 percent of the inventory represented legumes and open ground.

Forage Testing/Least-Cost Supplemental Feeding

The total digestible nutrients (TDN) in more than 50 percent of the bermudagrass hay, 70 percent of the fescue hay and almost all of the mixed grass hay samples submitted from ABIP farms from 1992 to 1996 did not meet the nutritional requirements of a 1,100-pound lactating beef cow at peak milk.

A **forage test** provides the nutrient contents of hay. Knowing the nutrient composition of hay allows for the comparison between hay nutrients and the nutrient requirements of the cattle being fed. If the animals' needs are greater than what's provided in the hay, a least-cost feed supplement can be developed. The cost of a forage test ranges from \$15 (routine analysis) to \$31 (complete analysis).

Least-cost supplemental feeding generally involves grouping animals based on their nutritional requirements, forage testing and identifying the costs of feed grains. To minimize feed costs, cattle with different nutritional requirements should be grouped separately and supplemented accordingly. Commingling cattle with different requirements (for example, nonlactating cows wintered in the same field as lactating cows) can cause either overfeeding and waste of costly supplements or underfeeding and poor cattle performance. Knowing the nutrient composition of the forage allows feeding lower-quality hay to cattle with lower nutrient requirements and feeding higher-quality hay to cattle with greater requirements. If the nutrients in the hay are less than the requirements of the cattle being fed, a least-cost supplement can be formulated based on local grain prices and alternative feed sources.

Least-cost supplemental feeding based on a forage analysis helped reduce supplemental feed cost on ABIP farms from \$43 per 1,000-pound cow in year 1 to \$31 in year 5. Supplemental feed cost averaged \$32 per 1,000-pound cow each year. However, some ABIP participants have chosen to improve hay quality by cutting earlier, thus eliminating the need for costly supplements.

Proper supplementation helped improve ABIP herd reproductive performance. Calf crop percentage increased from 85 percent in the first year of the program to 93 percent in the fifth year. Changes in the winter feeding program alone did not cause this increase, but it did play an important role.

The local county Extension office has a hay probe available to collect hay samples to submit for analysis and computer software for developing a least-cost feed supplement based on local grain prices, animal requirements and quality of available forage.

Mineral Supplementation

An analysis of forages submitted from ABIP farms indicated that sodium, selenium, copper and zinc were deficient in 50 percent or more of the samples submitted for analysis (Table 1). These minerals, as well as others, are necessary for proper enzyme and immune function.

Mineral (No. Samples)	% of Deficient Hay Samples	
	Gestating Cow ²	Lactating Cow ³
Calcium (185)	3.2	4.9
Phosphorus (185)	5.4	12.4
Potassium (185)	0	0.5
Magnesium (185)	0	22.2
Sulfur (185)	5.4	5.4
Sodium (56)	92.9	94.6
Iron (143)	0.7	0.7
Manganese (143)	1.4	1.4
Zinc (143)	50.3	50.3
Cooper (170)	56.5	56.5

¹Bermudagrass, fescue and mixed grass
²11 months since calving
³2 months since calving, 20 pounds peak milk

Mineral supplementation accounted for less than 5 percent of the costs specified in the ABIP cow-calf enterprise budget. Mineral cost averaged \$9.79 per 1,000-pound cow on farms participating in ABIP whole farms and projects (1993 to 2002).

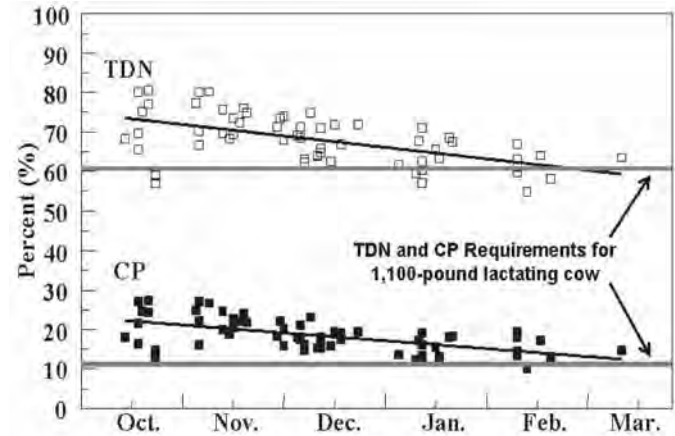
A complete mineral mix should be available to the herd at all times. Changes in mineral supplementation may be necessary during the year. For example, a producer may need to feed a high magnesium mineral in the spring to prevent grass tetany.

Stockpiling Fescue for Deferred Winter Grazing

Stockpiling the fall growth of fescue for winter grazing is one of the least used forage management practices in Arkansas. Stockpiling fescue can reduce winter feeding cost by minimizing the amount of hay to harvest and handle and possibly eliminating the need for haying equipment. One ABIP participant, using stockpiled forages, only fed hay when there was snow or ice, while another reduced his hay needs by 60 percent. Reducing hay quantity can also reduce hidden costs such as storage.

If planned properly, stockpiled fescue can provide a high-quality feed for the winter. Figure 1 illustrates the quality changes of stockpiled fescue over winter and how the forage met the nutrient requirements for gestating and lactating cows.

Figure 1. Quality of Stockpiled Fescue (1998-2002)



When the quality of the stockpiled fescue was at its lowest (January and February), the crude protein and TDN were similar to the average quality of fescue hay produced on ABIP farms. The average crude protein of fescue hay samples was 12.3 percent, and TDN averaged 56.3 percent. Therefore, stockpiled fescue can be of equal or greater quality than hay produced.

Controlled Breeding Season

Managing the cow herd to calve in 90 days or less can be one of the most important steps toward increasing efficiency and profitability. The breeding season for replacement heifers should begin one month before the breeding season for the mature cow herd. Exposing replacement heifers to a bull one month before the cow herd breeding season allows an extra month for heifers to recover from calving before the second breeding season begins.

Advantages of a **controlled breeding season** include:

- Reducing the number of times necessary to gather cattle for vaccinating and weaning.
- Marketing a more uniform calf crop.
- Optimizing the winter feeding program.
- Allowing the use of cow herd performance records to select replacement heifers and identify cull cows.

Demonstrations across Arkansas have shown that reducing the breeding and calving season is the first step toward improving beef cattle management

efficiency. Below are results from ABIP Breeding and Calving Season demonstrations:

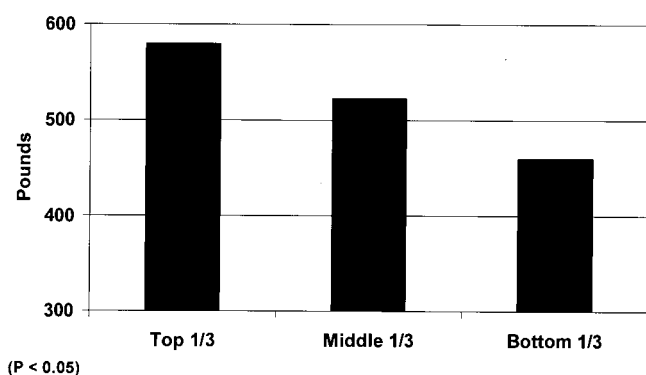
- The percentage of cows calving in the desired calving season improved from 36 to 100 percent.
- The average calving season decreased from 282 to 100 days.
- Direct cost per animal unit decreased 32 percent (\$180 to \$122).
- Herd break-even cost decreased 38 percent (\$0.50 to \$0.31 per pound).
- The gross margin (gross income minus direct cost) improved by 75 percent (\$78 to \$136 per animal unit).

By shortening the breeding and calving season to 90 days, oftentimes average calf weaning weights increase. A short breeding and calving season helps produce a more uniform calf crop that can be sold at a higher price. In some situations, shortening the calving season to 90 days or less may take three to five years. Nevertheless, the breeding and calving season is a key element to improving efficiency and profits.

Cow Herd Performance Testing

Cow herd performance testing is a management tool that aids in selection of replacement heifers and cull cows. The implementation of performance testing helped an ABIP participant increase the adjusted weaning weight of calves by 114 pounds over a 10-year period. The average cow weight (1,028 pounds) did not significantly differ across years; however, the increases in weaning weight raised the herd's average weaning weight efficiency (ratio of a calf's adjusted weaning weight to its dam's weight at weaning) from 42 to 50 percent.

Figure 2. Average Adjusted Weaning Weights of Calves From Cows in the Top, Middle and Bottom One-Third



An analysis of cow herd performance data from ABIP herds indicated the top one-third of the calves had an average adjusted weaning weight that was 121 pounds greater than calves in the bottom one-third (Figure 2). The average weaning weight efficiency (Figure 3) of the top one-third averaged 50 percent, whereas the average efficiency of cows with calves in the bottom one-third averaged 41 percent. There was no difference in annual cow cost¹ between cows in the top one-third (\$211) compared to cows in the bottom one-third (\$208). Therefore, it cost the same to maintain a good performing cow as it did a poor performer.

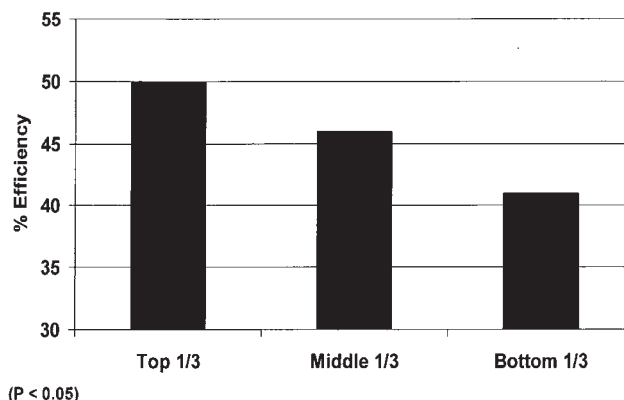
Culling cows from the bottom one-third of the herd and retaining top replacement heifers improve the herd's ability to wean more pounds more efficiently. More pounds weaned mean more potential income.

Enterprise Budgets

The **enterprise budget** is one of the least used management practices on ranches. To stay ahead in today's beef industry, one must develop business skills and look more closely at the financial aspects of beef production. A budget can help determine the cost effectiveness of the decisions that are made on the ranch. As one ABIP participant stated, "The budget tells the truth about the operation." Each enterprise on the ranch (cow-calf, stockers, replacement heifers, haying) needs its own budget. Budgeting individual enterprises will help determine which enterprise is most profitable and why others aren't as profitable.

Many state Extension programs have enterprise budgets available to producers. The summary of "state averages" allows the comparison of individual budgets to those state averages. If an item in the

Figure 3. Average Weaning Weight Efficiency of Cows in the Top, Middle and Bottom One-Third



¹Cow cost reflects the specified costs reflected in MP413, *Cow-Calf Enterprise Budget*, used on ABIP farms.

budget does not agree with what others are reporting, it should be looked at in further detail to determine why it is out of line.

The enterprise budget helped ABIP participants identify supplemental feeding practices as an area to address in their operations. The budget also helped one participant realize it was not cost effective to lease additional land under current operating conditions. Others found that implementing cost-effective management practices, such as implanting calves, improved their bottom line. One thing to avoid is cutting practices instead of cutting costs. Unless there is sufficient evidence to indicate a practice is not cost effective, removing the practice may cause production to decline.

Production Calendars

Developing a production calendar involves spending the first year keeping track of major farm activities. During the first year of participation in the ABIP, producers record all activities on the farm, month by month. Activities include haying, fertilization, weed control, planting dates, breeding and calving seasons, weaning dates, vaccinations, fly control, hay feeding and supplementation, to name a few.

Once one year of activities is outlined and reviewed, a production calendar for the upcoming year can be developed. Consider developing a production calendar with the help of the county Extension agent. The agent can review when activities were accomplished in the past and determine whether these practices are being accomplished during the right time of the year. On many of the ABIP farms, good sound management practices were being implemented. Some practices were being implemented during the wrong time of the year, and the full benefit of the practice was not obtained.

A well-planned production calendar will also improve the efficiency of the ranch. For example, if the calendar indicates vaccinating calves the following month, this adds additional time to plan the purchase of vaccines or schedule a veterinarian. Otherwise, an individual might travel to the local farm supply store at the last minute, only to find an insufficient supply of vaccine that could have been ordered or purchased elsewhere at a cheaper price. Better timing of a ranch practice may mean the difference between just breaking even or getting a positive return.

Summary

Implementing these common management practices is the first step to improving the overall efficiency and profitability of beef cattle production. Unlimited opportunities beyond these 10 practices exist to make the ranch more efficient. Every situation is different, and what works for one person may not work for others. Begin by identifying the goals of the ranch, then explore the options available to obtain these goals and select the options that generate the least amount of waste.

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