

Drought Management Strategies for Beef Cattle

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Introduction

Drought develops progressively and not overnight. Management of the ranch during a drought depends on the balance between stocking density and the availability of feed and water. In the long run, you can help protect your interests by sound planning to make your ranch decisions less sensitive to drought. Early decisions need to be based on what relief measures are potentially available on the ranch. Among the important factors are guessing the expected duration of the drought, the current water and feed inventories, the body condition of the cowherd and financial resources available. During drought, decisions may often be made on emotion rather than logic. The main goal is to make objective decisions and get skilled help when necessary from your county agent, beef specialist or agricultural consultant.

Effect of drought on range plants and management

Drought is a serious obstacle to successful range livestock management. Producers must understand how drought affects plants, grazing animals, and livestock management, and what options exist. Forage production is decreased dramatically, but reductions are less on range in good and excellent ecological condition. The ability of perennial plants to recover after drought is closely related to their vigor before, and during the drought. Excessive grazing (more than 60 % of current year's growth) decreases the ability of some plants to recover. Moderate use (25 - 55 %) does not seem to affect the recovery rate. A drought may require that livestock numbers be reduced according to forage supply. Retaining a rotational grazing system during drought is recommended over continuous grazing because periodic rests help plants maintain vigor. Concentrating more animals into a single herd is recommended over having several smaller herds because by having more animals in a pasture, the entire pasture will be grazed more uniformly, and more use will be made of the less-preferred plants. Other options include grazing crested wheatgrass earlier and longer than normal, because it is one of the plants most tolerant of grazing.

Another is keeping cattle on subirrigated sites longer than usual. Fertilizer could be used to increase forage production on many of these sites. However, fertilizer is a cash cost, and soils should be tested before fertilizer is applied. Fertilizer needs moisture to be available to the plant, and in times of extreme drought this may not happen.

Initial Questions:

The producers who survive best during drought are those who adopt sound management and financial plans and review them regularly. They make firm decisions, and act quickly and early. Keep alert for opportunities such as buying or leasing land instead of buying feed and replacing older animals with younger ones. Four factors which affect risk management during a drought include: 1) the total population of cattle in relation to feed availability, 2) how widespread the drought-area is, 3) the time of year

and the likely hood of rain and return to adequate feed supplies in your area and, 4) evaluation of cash flow needs (borrowing your way through a drought to maintain traditional herd size may inhibit long-term profitability).

Questions to answer when facing a drought:

- Are my animals losing weight or not performing adequately?
- Will I have to start to provide supplements?
- If the drought continues, should I cull non-productive animals?
- What feeds are available to the ranch?
- Assuming that I will have to purchase supplemental feeds, are they available and at what cost?
- Is one option to sell hay and buy back grain for limit feeding?
- Do I have the feed resources to allow for full feeding vs. supplementary feeding only vs. limit feeding of grain?

Several options to consider during a drought include:

- Do nothing.
- Selective reduction of the cow herd, especially the unproductive cows.
- Leasing of additional grazing ground vs. purchasing of supplemental feeds.
- Purchase supplemental feedstuffs.
- Move the cow herd to a dry lot for full feeding.
- Limit feed grain to meet nutrient requirements.
- Sell all the livestock.

Keep the following in mind with regard to cow management:

- Fertility of cows may decline when their body condition drops below a 4; especially at time of calving and when they go into the breeding season in poor condition. In the absence of sufficient nutrients, particularly energy, cows lose considerable weight. When such weight losses occur, milk production decreases and reproductive activity may cease. The end result is light-weight calves and open cows. To prevent such undesirable effects, cows either must be provided sufficient nutrients to avoid weight losses and maintain production requirements or they must be relieved totally or partially from body stresses.
- Early weaning of calves is one option which allows cows to rebuild body reserves and rebreed the next year.
- Money and diminishing feed reserves are too valuable to waste on cows that are unproductive, not pregnant or are unsound. These animals are candidates for culling.

Considerations for water during a drought: Water requirements may double by cattle during hot weather. If cattle do not meet their water needs, they may refuse to eat, experience lowered production, and become sick. The following table provides estimates of water consumption for cattle.

Table 1. Estimated water consumption by different classes of beef cattle (North Dakota Extension Service)

Class of beef cattle	Estimated water consumption at 88 °F, gallons/day
Cows	
Dry	14
Lactating	17
Bulls	18
Growing cattle	
400 lbs	9
600 lbs	12
800 lbs	14
Finishing cattle	
600 lbs	14
800 lbs	17
1000 lbs	20
1200 lbs	23

In some areas you may be able to develop a spring or seep (a flow of ½ gallon per minute amounts to 720 gallons per day). Consider the possibility of installing a larger storage tank and piping water to troughs. You may need to install high-pressure plastic pipe to carry water from a central source. Although expensive initially, pipelines will prove useful for many years. Hauling stock water is expensive. However, it may be a viable strategy in some situations.

One concern about cattle drinking stagnant pond water during hot, dry weather is that animals can die if the water contains certain species of blue-green algae. Toxic blue green algae blooms occur because of favorable conditions including hot, sunny days and warm, nutrient-rich water. Toxic blooms of algae are unpredictable. Also, not all blue green algae are poisonous, and the blue green algae which can generate poisonous toxins do not always do so. Blue green algae congregate on or near the water surface. Convulsions, bloody diarrhea, and sudden death characterize intoxication with blue-green algae. Affected animals rarely range far from the water source. Clinical signs in blue green algae poisoning include nervous derangement, staggering, tremors, and severe abdominal pain.

Presence of potentially poisonous blue green algae may be determined by microscopic examination, but the presence of algae does not mean the water is toxic. If you suspect blue green algae, contact your veterinarian or county agent to determine which samples would be appropriate for your situation. If concentrations of blue green algae are suspected, walk around to the windy side of the water body. If any dead animals such as mice, muskrats, birds, snakes or fish are present, assume a poisonous condition exists.

Supplementing cattle on drought affected pastures and ranges.

Producers generally have two options for meeting the nutrient requirements of cattle on drought affected pastures and ranges. The first is to provide supplemental feed to ensure the cow herd has adequate energy, protein, vitamins, and minerals. The second is to reduce the nutrient requirements of the cow to a point where they can be met with available forage.

Drought-affected pastures and native range generally do not produce adequate forage to maintain 'normal' stocking rates, so producers must provide supplemental energy to meet the needs of the cow herd. If you do supplement hay on range land, try not to buy, or harvest, weed-infested hay. The future cost of feeding weed-infested hay far out-weighs its feed value in the short-run. If weedy hay must be fed, feed in an area or holding pasture that is removed from streams, riparian areas, and wooded areas. Be sure to keep cattle confined for several days after feeding the weedy hay to prevent them from spreading viable seed from their digestive tract. Observe holding pastures and feeding areas closely, and treat weed infestations. Try to take advantage of areas dominated with annual species. They should be grazed early in the season when their nutrient value is high. This will allow grazing deferment on the higher-condition range dominated with perennial plants.

Available crop residues such as small grain straws, and other byproducts of crop production represent important methods of stretching tight feed supplies during drought conditions.

Pastures and native range that are dormant due to drought conditions may be low in vitamin A, phosphorus, and protein. Meeting the need for these nutrients is important if cow herd productivity is to be maintained.

Reductions in stocking rate will benefit range plants by reducing stress and will also provide more forage for remaining cattle. When stocking rates are reduced in accordance with production, only small effects on weaning weight may be noted. If stocking rate is not reduced, supplemental feeding is necessary to maintain herd productivity and alleviate grazing pressure.

General recommendations:

Minerals. Provide the same salt and mineral mixture during drought as you would during normal conditions. However, during drought phosphorus supplementation is even more critical. A complete mineral supplement containing 12% calcium, 12% phosphorus, 5% magnesium, 0.4% zinc (4000 ppm), and 0.2% copper (2000 ppm) has worked well in many areas. The mineral supplement should be placed close to stock-watering locations.

Vitamin A. Lack of vitamin A may become a problem during the fall and winter for cows that grazed drought-affected pastures during the summer. Vitamin A is lacking in forages growing under drought conditions and hay produced from drought-affected forages. Cows should receive vitamin A and D booster shots approximately 30 days prior to calving if they have not been previously supplemented with vitamins.

Protein. Pastures dormant due to drought conditions may be deficient in protein. If these conditions occur during the breeding season, reductions in pregnancy rate can occur. Provide dry cows with approximately 0.5 - 0.75 pounds of supplemental crude

protein and lactating cows with 0.9 - 1.2 pounds of supplemental crude protein per day. This can be fed as approximately 1.0 - 1.5 pounds of soybean meal for dry cows and 2.0 - 2.5 pounds of soybean meal for lactating cows. Feed one pound to two pounds per day of a high protein supplement to dry cows and possibly as much as two pound to three pounds to lactating cows to maintain forage intake and efficient utilization of the forage.

Protein supplementation may be necessary for optimum breeding rates during drought conditions. Oil-seed meal supplements (cottonseed meal, soybean meal, and canola meal), commercial protein blocks, liquids, and tubs would also be appropriate. Alfalfa hay, sunflower meal, safflower meal, as well as other protein meals may also be used as protein supplements.

Energy. During drought conditions, energy may be the most limiting nutrient for grazing cattle. Several options are available for supplying energy to cattle on drought stressed pasture. Hay, grain, and crop processing byproducts can all be used to supply energy to grazing cattle. Low-quality forages can also be ammoniated to increase digestibility and protein content.

Grain supplementation on pasture can result in a "catch 22" problem. Excess supplemental grain can reduce forage intake and digestibility, resulting in less energy available to the animal from available forage. As a general rule of thumb, up to 0.2 percent of body weight of supplemental grain per head per day will not result in large decreases in forage intake and digestion. For example, a 1,200-pound cow could receive 2.4 pounds of grain per day without drastically reducing forage utilization. For some grains, processing may be necessary for optimum use by cattle. Corn and oats can be fed whole but may be utilized better if coarsely rolled before feeding. However, barley and wheat should be coarsely rolled. Avoid fine grinding and rolling, which results in excess fines and dust. These can result in increased incidence of acidosis and founder. In addition, extremely dusty supplements are unpalatable. However, the producer must weigh the additional costs of processing vs. the value of the grain. Grain processing co-products such as wheat midds, soybean hulls, and corn gluten feed which contain highly digestible fiber provide energy while alleviating much of the negative impact that grain supplementation has on fiber digestibility. In addition, these byproducts provide protein which may also be limiting in drought stressed forages. When using by-product feedstuffs, make sure that the mineral program is balanced. These feeds are typically high in phosphorous and potentially high in sulfur, which may lead to some mineral imbalances. The trace mineral levels may be somewhat low as well.

Drylot Feeding. If pasture conditions are extremely poor, producers may consider feeding cows in drylot. This may be more cost effective than supplementation on range if large amounts of supplement must be transported and fed to cows daily. In addition, it may allow pastures a much needed rest period to begin recovering from the drought.

Two Options: When *pasture is lacking in amount as well as quality*, the following suggestions are offered: If only slightly limited, the feeding of range cubes (minimum 20% crude protein) or mixtures of grain and cottonseed or soybean meal at rates of 3 - 5 pounds per cow daily may work for a while. Cubes with a large amount of natural protein and a low crude fiber level (less than 10%) would be preferred.

When *pasture becomes extremely short*, purchase of hay or a replacement feed for the pasture must be considered as well as selling of stock. Remember that most grass

hay has only 50 - 65% the energy content of grain so that one pound of grain can replace 1.5 - 2.0 pounds of hay. A pound of grain will only replace 1.2 - 1.4 pounds of alfalfa hay. It doesn't make sense to pay \$105 per ton for poor quality grass hay when grain would cost very little more. It is necessary to start cows on grain slowly and feed so that all cows have opportunity for their share of the feed. It is possible to feed up to 80% grain in a maintenance diet for British bred cows, but such high levels should not be considered for Brahman cattle. All cattle need some forage in the diet to minimize digestive problems.

Reducing nutrient requirements of the cow herd

Lactation represents the greatest nutrient demand for cows during a yearlong production cycle. Lactation increases demand for energy, protein, and other nutrients. One of the simplest ways to reduce nutrient requirements is to wean the calf. This practice can cut nutrient requirements by one-third to one-half depending on milk production of the cow. Early weaned calves can achieve adequate rates of growth if given access to a high quality ration. Dry cows will eat less forage and usually travel further distances for forages than lactating cows further reducing demand placed on the pasture. By removing the demands of lactation, acceptable pregnancy rates and calving season length can usually be maintained.

Producers may consider early weaning only a portion of the herd. In this case, logical candidates for early weaning are cows nursing their first and second calves. These animals have nutrient requirements for growth in addition to maintenance and lactation. The nutrient requirements for lactation and growth are given higher priority than the need to reproduce. By removing the demands of lactation on nutrient requirements, growth and reproduction will receive a greater proportion of the nutrients available.

Unavailability of feeds or unusually high cost often prohibits feeding lactating cows the nutrients necessary for lactation and rebreeding. Production requirements of the mature cow for which nutrients are needed include body maintenance, lactation and rebreeding. First-calf heifers and young cows must have additional nutrients for growth. To reduce stress and lessen the total feed necessary, the only production requirement that can be removed is lactation. Lactation stress may be removed from cows or heifers by weaning calves after 60 - 80 days of age, or partially removed by creep feeding.

Feeding Management Options:

- Design your feeding program to get the most mileage from the available feeds on your ranch or in your area.
- Supplement low-quality feeds correctly. Your county agent or nutrition consultant can help you determine if you are meeting the cows and calves nutrient requirements.
- Underfeeding nutrients lowers production. Overfeeding nutrients increases feed expense and reduces the net return over feed expense.
- Make every effort to reduce feed wastage.
- Feed the highest quality feeds to animals that have the highest nutrient requirements, (replacement heifers, growing calves, lactating cows).
- Feed the lowest quality feeds to cows in the middle-stage of pregnancy.
- Save the better quality feeds for those periods just before and after calving.

- Consider substituting grains for hay when these substitutions can balance the ration more adequately at a lower price (see section on substituting grain for hay).
- Consider ammoniating crop residues such as wheat and barley straw to improve digestibility and intake.

Ammoniated straw may be an option. Ammoniation of straw with 60 pounds of anhydrous ammonia per ton of straw will increase cattle performance and make it possible to utilize wheat straw as the only roughage in the diet, something not recommended for untreated straw. A summary of four trials is presented in Table 2 indicating that actual daily gain was improved by ammoniation by .31 - .82 pounds daily.

Table 2. Summary of results using ammoniated wheat straw

Source	Cattle type	Daily gain, lbs		Response
		Untreated	Treated	
Oklahoma	Yearlings	.60	1.25	+.65
Oklahoma	Open Cows	.09	.40	+.31
Nebraska	Preg. Cows	.26	.88	+.62
Purdue	Preg. Cows	-1.00	-.18	+.82

The improvement in gain resulted because of increases in digestibility and intake. Two to 3 pounds of supplement or alfalfa hay were fed along with free choice ammoniated wheat straw. Ammoniation alone does not make wheat straw a complete feed. A good mineral/vitamin supplement will be essential and supplementation with 1-2 pounds of natural protein is needed along with the non-protein nitrogen added by ammoniation. Toxicity problems, involving calf losses and wild irrational cattle behavior, have been reported when ammoniating high-quality forages. Toxicity problems have not been observed with ammoniation of wheat straw or similar products.

Stay alert for potential problems which might be a result of drought conditions:

- The use of salt to limit supplement intake may increase water intake 50 - 75%. Water must not be limited in any way or salt toxicity may result.
- Over-consumption of urea-containing supplements by cattle on forage scarce ranges may result in ammonia toxicity. Generally, cattle performance on urea-type supplements can be lower than expected when energy or forage is in short supply.
- Hay cut under moisture stress conditions, especially grain type hays, may contain high levels of nitrate. It is recommended to test for nitrate before feeding such hays, especially before feeding large amounts. Be sure to take a good representative sample for analysis.
- Prussic acid or cyanide poisoning can also be a problem in grazing drought-stunted plants such as sorghum, sorghum hybrids, and sudan grass. If forage for hay is allowed to sun cure thoroughly for three to five days, bleaching out any bright green color, prussic acid problems should be lessened.
- Cattle grazing short pasture are more likely to consume poisonous plants.
- Alternate day feeding of protein supplements (> 30% crude protein), like oil-seed meal cubes, has been recommended to save labor. The practice is still good for high protein supplements but is not to be used for grain type supplements. High energy

supplements (grain, breeder cubes, etc.) should be fed daily especially where $\geq .5\%$ of body weight may be fed daily. High-energy acid-producing feeds tend to decrease rumen pH and fiber digestion and alternate day feeding of large amounts simply magnifies the decrease in rumen pH. Furthermore, unadapted cows should be started on grain feeding slowly or the problems of acidosis, founder and even death may result.

- Rumen impaction may result where cattle receive inadequate protein (less than 7% to 8% CP in total diet) and too much of a low quality/high fiber forage such as drought pasture or wheat straw only. Lack of adequate water will aggravate the impaction problem.
- Hardware disease. Hay harvested from vacant city lots, roadsides etc., may contain nails, wire or foreign objects which can pierce the rumen wall resulting in death of the animal. Close observation of feeds and the use of magnets in grinder/mixers can help to reduce the potential consumption of problem materials by animals.

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