Evaluating Alternative Feed Sources During Drought

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Introduction

During years of drought, it is important to critically evaluate alternative feed sources available for cattle. The traditional method for sustaining a herd through a drought is feeding extra stored forage to compensate for decreased forage production or decreased forage quality available on rangelands and pastures due to drought conditions. However, hay prices rise substantially, and availability decreases due to irrigation water limitations and increased demand from livestock producers. This fact sheet will evaluate why hay prices rise and what alternatives are available to compensate for forage reductions during drought.

Why Do Hay Prices Increase During a Drought?

To understand why hay prices increase during a drought, we have to rely on one of the first principles we learn in economics: supply and demand. The supply of hay in the West varies due to changes in precipitation. The fact is that most of the Intermountain West states rely on irrigation water to grow hay. Utah is particularly susceptible to irrigation water shortages disrupting hay production. A lot of Utah's irrigation water comes from stored water in reservoirs, but during multi-year droughts, decreased precipitation will affect overall hay production. This means the hay producers must raise the prices because it costs them as much as previous years to produce the hay, but they have less product to sell to the consumers due to decreased production.

The second reason hay prices increase is demand from livestock producers. With a reduced supply of what everyone needs (hay), competition increases to buy what limited resources exist. Those competing for the hay include traditional cattle producers, dairies, horse producers, and other livestock producers. Compounding this demand issue, livestock producers are typically buying more hay than they normally would due to drought.

Using Alternative Feed Sources

Livestock producers have traditionally used hay because it is readily available in most years, easy to feed, stores easily, and animals will perform well if fed properly. However, in a multiple-year drought, hay is not as readily available, and purchasing above-normal amounts will dramatically increase the cost of production for many producers. As such, livestock producers may consider using nontraditional or alternative feed resources to meet their livestock's nutritional needs without increasing production costs. However, when using alternative feeds, it is essential that the feedstuffs not only meet livestock nutritional needs but also be cost-effective and fed on a least-cost basis (Lardy et al., 2016).

Classified as food production byproducts, many alternative feeds are no longer usable for human consumption but may provide significant nutrient value to livestock. However, many of these alternative feeds are used as a supplement to extend hay inventories to decrease the amount of hay needed to meet livestock nutritional needs. Since these feeds supplement hay usage and there is some variability in alternative feed nutritional value, we recommend conducting a feed analysis before feeding (Lardy et al., 2015). Furthermore, it is important to note that cattle have different nutrient needs depending on their stage of production (Tables 1 and 2).

Table 1

Nutrient Demands of Beef Cattle Before Calving

	Months to calving				
	5	4	3	2	1
	1000 lb cow				
DM intake, lbs/d	19.8	20.3	20.9	21	21.4
TDN, lbs/d	9.5	9.9	10.4	11.2	12.2
NEm, Mcal/d	8.12	8.52	9.2	10.29	11.61
CP, lbs/d	1.33	1.4	1.48	1.64	1.88
	1200 lb cow				
DM intake, lbs/d	22.7	23.3	23.9	24.1	24.6
TDN, lbs/d	10.9	11.4	12	12.8	14
NEm, Mcal/d	9.3	9.79	10.52	11.81	13.53
CP, lbs/d	1.54	1.61	1.72	1.9	2.19
	1400 lb cow				
DM intake, lbs/d	25.5	26.2	26.8	27	27.6
TDN, lbs/d	12.3	12.8	14.2	14.4	15.8
NEm, Mcal/d	10.46	11	11.79	13.23	15.18
CP, lbs/d	1.73	1.81	1.93	2.13	2.46

Notes. Adapted from *Nutrient Requirements of Beef Cattle*, 7th edition (National Research Council [NRC], 1996).

Intake and nutrient concentrations are expressed on a dry matter basis.

Table 2

Nutrient Demands of Lactating Heifers and Cows of Various Sizes

Beef female class	Expected mature weight, lb	Months since calving	Daily dry matter intake, lb	Total digestible nutrients, % dry matter	Crude protein, % dry matter
Lactating cows (20 pounds peak milk production)	1000	1	24	59.6	10.5
		2	25	60.9	11.2
		3	25.4	58.6	10.4
	1200	1	26.8	58.7	10.1
		2	27.8	59.9	10.7
		3	28.4	57.6	9.9
	1400	1	29.5	58	9.8
		2	30.5	59.1	10.3
		3	31.5	56.8	9.6
Lactating 2-year-old heifers	1000	1	20.4	61	10.6
		2	21.2	62.1	11.1
		3	21.8	59.8	10.4
	1200	1	22.9	60.4	10.2
		2	23.8	61.4	10.7
		3	24.5	59.2	10
	1400	1	25.3	60	10
		2	26.2	60.9	10.4
		3	27.1	58.7	9.7

Note. Adapted from the *Nutrient Requirements of Beef Cattle*, 7th revised edition (NRC, 2000).

Considerations When Using Alternative Feeds

While there are many advantages to utilizing alternatives, some considerations must be evaluated prior to use. The first is transporting the feed. If the feed is delivered to you, a cost analysis that includes the shipping will determine if the alternative is still cost-effective when compared to using hay. The second factor to consider is feed storage. In many cases, the alternative may come in a pelleted form, have a higher moisture content than hay, or come in a form requiring a new feeding method. Specifically, higher-moisture feeds may have to be stored differently and may have a shorter stored life than dried, cured, or pelleted feeds. The last factor that must be considered is the level of starch in the feed. High levels of starch or sugar in the feed may alter the PH of the rumen. When starch and sugar is rapidly digested in the rumen, the rumen can become more acidic. Long-term acidity in the rumen can result in acidosis, which can lead to deceased productivity and even death. As such, it is important that forages (hay) still be incorporated into the diet and starch-rich feeds be mixed in at proper levels.

Grazing Crop Harvest Residue

Utilizing crop residues via grazing or feeding may be the easiest method to maximize using unharvested feed post-harvest. Grazing harvest or crop waste allows animals to select higher-quality feed, normally obtained by feeding harvested, mechanically separated product. This feed can include regrowth, shelled grains, or stubble that can be grazed directly. This extremely cost-effective strategy allows cattle access to high-quality feed that is usually lost to waste. A second benefit is that manure is spread around where the cattle graze, which is lower in cost than removing from pens and then subsequently spreading.

While there are multiple benefits to this strategy, there are also some drawbacks to consider. Mineral, protein, and energy supplementation are likely still required. Moreover, the potential of nitrate poisoning needs to be evaluated. Specifically, drought-stressed plants can accumulate nitrate, and recently fertilized fields should not be grazed. It is important to note that as plants mature, nitrate levels decrease and stalks potentially contain more nitrate than leaves and seed. However, not all drought conditions lead to excess nitrate levels. There must be some moisture in the soil for the roots to uptake the nitrate. If the soil is dry, little nitrate uptake will occur, but if there is a rain event, nitrate levels will remain high for several days following rain. Thus, it is important to test potential feed sources and dilute or combine potential high nitrate sources with other forages or feedstuff lower in nitrate.

Pelleted Feeds

Another alternative option readily available in the Intermountain West is using pelleted feeds such as alfalfa pellets. At this time, there are three major benefits to utilizing this feed. The first is that it is more cost-effective to purchase than hay. Currently, a producer can purchase pelleted alfalfa for $200–$300/ton when compared to hay for $350–$400/ton. A second major benefit is that it is palatable to cattle, and we know they will eat it willingly. However, Bruegger and others (2020) report that cattle will ingest pellets much more rapidly, so there may be an acclimation period when animals will not

display as hungry due to feed not being present for longer periods of time. The last major advantage is that there is typically less wastage associated with pelleted feeds. Specifically, cattle are not pulling feed away from a bale, putting it on the ground, and then stomping it into the soil. Pelleted feeds are typically easily ingested from feeders or troughs, and little is wasted. However, in many instances, this may require investment in troughs or bunks to minimize pelleted feed wastage. While pelleted feeds have some significant advantages, it is still very important to calculate shipping costs, how this feed will be stored, and any modifications needed to feed this alternative in your operation.

Brewers' Grains

A major advantage with the boom of microbreweries in the western United States is the availability of brewers' grains or brewers' waste. These are spent grains (barley or a mixture of barley and other cereal grain or grain products) that result from brewing beer. In the past, the sole source of these grains was from large commercial brewing operations, but as previously mentioned, due to the microbrewery boom, these have become more available on a smaller scale. Due to the higher protein and energy content of many of these grains, they tend to be higher-priced. Therefore, they are very valuable; use them when protein and energy supplementation are needed and feed them in combination with adequate amounts of hay. However, one of the major disadvantages to brewers' grains is that they have about a 75–80% water content (Gadberry, 2014). As such, a load of brewers' grains received during the summer months should be fed within a week of delivery to avoid spoilage. This can be seen as both an advantage and

disadvantage. While the smaller scale breweries can only supply a smaller amount of brewers' grains, it may prove advantageous because the feed must be utilized quickly. Storing large amounts may result in large amounts of wastage.

Human Feed Waste or Factory Rejections

While this is a much broader category, it usually encompasses products from human food production. This can be anything from byproducts (yogurt waste, cereal grain waste, etc.) to factory rejects of cereal or human snack food. While these are more readily available, they do come with the disadvantage of variable nutrient value. As with any of the other alternative feed sources, you must evaluate their nutrient value, palatability (potential acclimation time for animals to eat), and shipping and storage considerations.

Summary

In a multiple-year drought like the one the Intermountain West currently faces, it is vital that producers implement unconventional practices to keep operations economically resilient. Increasing hay prices, decreasing hay supply, and increasing competition for hay resources are catalysts for considering alternative feed sources. The importance of evaluating and incorporating alternative feed sources into our production system allows producers to maintain productivity while maintaining a cost of production that allows resilience during volatile environmental and market situations. However, as with any new production practice, it is essential to evaluate risk, cost, and long-term effects. Specifically, with alternative feeds, we must evaluate the following: the nutrient value of what we want to incorporate; how it will supplement hay feeding; if it will prolong hay storage; if it will allow animals to remain productive; and most importantly, if it is cost-effective.

Literature Cited

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