

# Utah Livestock Producer Preferred Drought Management Strategies

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## Introduction

Livestock production plays a vital role in Utah's economy as livestock sales generate \$1,278 million annually, representing 70% of all Utah agricultural sales (USDA NASS, 2017). However, agricultural production puts large demands on water resources as agriculture consumes 80% of all water in the United States (USDA ERS, 2019). Thus, climate change impacts and drought, especially in drought-prone areas of the southwest U.S., pose a threat to productivity in the agricultural sector, as well as the economies of rural and tribal communities.

Utah is currently the third driest state in the United States, as 65% of the state experienced abnormally dry conditions from 2000 to 2019 (NIDIS, 2019a). In 2018 and 2019, 38% of the state experienced severe drought (NIDIS, 2019b). Severe drought is connected to heavy pasture and crop losses as well as water shortages requiring restrictions on use, especially in the late summer months. Hence, persistent drought often leads to severe economic consequences in rural communities (Lal et al., 2012; Howitt et al., 2017).

Considering the large contribution agricultural production makes to Utah's economy, approx. 2% of GDP (BEA, 2019), agricultural adaption to drought in order to maintain food and feed production is critical. This fact sheet examines the preferred drought management strategies of livestock producers and how their preferences change depending on drought severity and expected grazing efficiency.

## Study Overview and Data

The aim of the study conducted by Utah State University described here was to determine agricultural producer preferences for drought management strategies and how their preferences shift in response to varying levels of drought conditions and expected crop yield or grazing efficiency losses. Data was collected at producer meetings and online in 2019 for three groups of producers: hay and forage growers, fresh produce growers, and livestock producers. This fact sheet provides an overview of the results for livestock producers.

## Producer Characteristics

Among livestock producers who participated in the study, 48 respondents answered important study questions and were included in the final sample. The majority of these participants manage 51-200 animals (56%), are primarily cow/calf operations (82%), and sell their products through direct sales outlets (58%). Also, 74% of respondents use conventional production methods, and 67% selected feed quantity as the largest issue resulting from drought. Finally, 38% of the respondents considered grazing efficiency reduction of 40-59% large, while 33% of the respondents were more sensitive to grazing efficiency losses, considering losses under 40% large. Table 1 provides an overview of producer characteristics.

**Table 1.** Characteristics of Livestock Producers

Characteristic	Category	Count	% share
Primary operator gender	Male	34	81%
	Female	8	19%
Primary sales outlet	Direct	25	58%
	Wholesale	15	35%
	Other	3	7%
Animals managed (number)	<51	5	19%
	51-200	15	56%
	201-400	6	22%
	401-700	0	0%
	>700	1	4%
Primary livestock type	Cow/calf	37	82%
	Feeder cattle	2	4%
	Sheep/lamb	3	7%
	Other	3	7%
Production methods used <sup>1</sup>	Conventional	34	74%
	Organic	3	7%
	Grass-fed	18	39%
	Natural	12	26%
	Hormone-free	10	22%
Largest issue resulting from drought	Feed quantity	18	67%
	Feed quality	1	4%
	Summer range degradation	4	15%
	Need to haul water	1	4%
	Other	3	11%
What is a large reduction in grazing efficiency to you?	80-99%	1	4%
	60-79%	6	25%
	40-59%	9	38%
	20-39%	6	25%
	<20%	2	8%
Number of respondents	-	48	100%

*Note:* Sum of responses per characteristic may not add up to 48 (some answers missing).

<sup>1</sup> Producers may use multiple production methods.

### Preferred Strategies

First, livestock producers were asked to select their most preferred drought management strategy from a list of options, assuming a drought that could cause large grazing efficiency losses, but not specifying a grazing efficiency loss amount for each strategy. The results in Table 2 (panel A) show that most livestock producers (50%) preferred to purchase feed or lease additional grazing area, followed by reducing the herd, the second most preferred strategy preferred by 38% of livestock producers. The remaining options were most preferred by very few producers as only 8% preferred changing livestock type and 4% preferred transitioning out of livestock production.

Producers were then asked which one of the four drought management strategies they would adopt, while assuming a drought that could cause large grazing efficiency reductions, but also specifying the expected grazing efficiency reduction (varying at 20%, 40%, 60%, and 80%). Producer responses were used to determine their preferences among the strategies (see Table 2,

panel B). Specifically, the analysis revealed the rank of strategies assuming no reduction in grazing efficiency, as well as the impact of changing grazing efficiency on producer preferences.

As shown, producers prefer most to purchase feed or lease additional grazing area. They are most likely to choose this strategy, regardless of whether information about grazing efficiency losses is provided or not (ranked first in both cases). The odds of producers choosing to reduce the herd are 56% smaller, although not statistically significant. However, producers are significantly less likely to adopt the remaining two strategies, transition out of livestock production (96% less likely than the most preferred strategy) and change livestock type (98% less likely). In summary, the rank of the four strategies changes slightly when information about grazing efficiency losses is provided. However, we find that varying grazing efficiency does not change producer preferences for the strategies overall.

**Table 2.** Producer Preferences for Drought Management Strategies

Strategy	A. No grazing efficiency information provided		B. Grazing efficiency information provided	
	Rank	% of respondents <sup>1</sup>	Rank	Odds of choosing strategy <sup>2</sup>
Purchase feed/lease additional grazing area	1	50%	1	Baseline
Reduce the herd	2	38%	2	-56%
Change livestock type	3	8%	4	-98%**
Transition out of livestock production	4	4%	3	-96%**

Notes: \*\* denote significance at 5% level.

<sup>1</sup> Percentages represent share of respondents who selected given strategy as most preferred.

<sup>2</sup> Odds of choosing a strategy relative to the most preferred (#1) strategy. For example, the odds of producers choosing to change livestock type are 98% smaller than odds of purchasing additional feed. 0% would indicate that the odds of choosing a given strategy are the same as the odds of choosing the base strategy.

Producer preferences for the drought management strategies may differ across producer subgroups. Table 3 reports the probability (percentage) of selecting a given strategy relative to purchasing feed/leasing additional grazing area, the most preferred strategy, assuming no grazing efficiency reduction. Statistically significant changes in odds are highlighted in bold font.

**Table 3.** Preferences for Drought Management Strategies by Producer Subgroups

Characteristic	Category	Reduce the herd	Transition out of livestock	Change livestock type
Gender	Male	-57%	<b>-96%</b>	<b>-97%</b>
	Female	+32%	-70%	<b>-94%</b>
Primary sales outlet	Direct	-32%	<b>-92%</b>	<b>-98%</b>
	Others	<b>-65%</b>	-95%	<b>-96%</b>
Animals managed (number)	<51	+256%	<b>-100%</b>	-68%
	51-200	-38%	-86%	<b>-96%</b>
	>200	<b>-95%</b>	<b>-100%</b>	<b>-100%</b>
Primary livestock type	Other than cattle	-20%	<b>-100%</b>	-85%
	Cattle	-55%	<b>-93%</b>	<b>-98%</b>

Production methods used	Only conventional	<b>-69%</b>	-91%	<b>-99%</b>
	Differentiated	-43%	<b>-100%</b>	<b>-98%</b>
Large reduction in grazing efficiency	0-39%	-39%	<b>-100%</b>	-76%
	40-59%	-29%	<b>-89%</b>	<b>-100%</b>
	60-99%	-36%	-86%	<b>-100%</b>

*Notes:* Bold font indicates that the percentage change in the odds of selecting given strategy relative to the base (most preferred) strategy is significant within the producer subgroup.

Generally, purchasing feed/leasing additional grazing area (base strategy) and reduction of the herd, both relatively less complicated and cheaper solutions, are similarly preferred and more likely chosen than the other two strategies across the subgroups of livestock producers, with some exceptions. Producers not using direct sales methods, managing more than 200 animals, and using only conventional production methods are 65%, 95%, and 69% less likely to choose herd reduction compared to the base strategy. On the other hand, female producers, those utilizing other than direct marketing, those managing 51-200 animals, those using only conventional production methods, and those considering grazing efficiency reduction of 60-99% to be large, are all similarly likely to choose transitioning out of livestock production as the base strategy. Also, producers managing 50 animals or less, those primarily raising livestock other than cattle, and those considering grazing efficiency reduction of 0-39% to be large, are similarly likely to choose changing livestock type as the base strategy.

Those managing more than 200 animals differ most from the other subgroups; they prefer almost exclusively the base strategy and they are 95-100% less likely to select other offered strategies. The percentage changes in odds, reported in Table 3, are related to the scenario when there is no grazing efficiency reduction. However, we also found that grazing efficiency reduction does not have a significant impact on the preferences indicated in Tables 2 and 3. Finally, producers were asked under what conditions they would sell their herd off completely. Of the 25 producers that responded, 36% indicated they would cease if there was no or minimal pasture/forage, 16% mentioned no water/irrigation, 12% mentioned multi-year drought, 12% mentioned high feed cost, and 12% would not sell their herd under any circumstances.

## Conclusions

Drought conditions would have to be very serious and long-term for livestock producers in Utah to transition out of livestock production. They are more likely to purchase feed or lease additional pasture, as well as reduce the herd, than change livestock type or transition out of livestock production. Also, livestock producers are not considerably sensitive to the percentage of grazing efficiency losses and associated drought severity since it did not influence their preferences among strategies. However, we find some differences in preferences for the strategies across producer subgroups.

Policies to improve uptake of drought management strategies should target producer preferred options as they are more likely to be successful. Policies which provide incentives such as covering a portion of the costs to implement drought management strategies are also recommended.

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