Managing through Drought with the Livestock Forage Disaster Program



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Abstract

Production agriculture is an inherently risky business. For livestock producers in particular, drought is one of the most common disasters they face. While the Livestock Forage Disaster Program (LFP) was permanently funded by Congress in the 2014 Farm Bill to help livestock producers manage these risks, producers still face a number of management decisions that impact their bottom line. In this study, we examine the interaction between LFP and various alternative management strategies using simulation analysis. We find that LFP does not fully offset the losses incurred due to drought—regardless of management strategy—particularly in the case of longer-term drought.

BACKGROUND

Production agriculture has always been a risky business. Livestock production is particularly vulnerable to regional weather events, with drought being one of the most common. While Congress has provided livestock producers with a number of risk management tools—ranging from the Livestock Forage Disaster Program (LFP) to the Pasture, Rangeland, and Forage (PRF) insurance policy—producers still face several management decisions that greatly affect their bottom line (Fischer, Benavidez, and Hagerman, 2022). In this study, we explore the interaction between LFP and the management decisions made by cattle producers.

Although cattle producers historically have not had a robust safety net, much has changed over the past decade. One of the more notable changes was the permanent funding provided for LFP in the 2014 Farm Bill. LFP provides financial assistance to livestock owners who have suffered a loss of forage due to qualifying drought during the county's normal grazing period (USDA, 2019). Producers are eligible for monthly payments based on severity and length of drought. LFP payment rates are based on monthly feed costs incurred by producers, and the number of monthly payments a producer is eligible to receive is based on county drought ratings from the U.S. Drought Monitor and the length of time the county has been in drought. Producers with eligible livestock that have been in counties in:

- D2 drought for at least eight consecutive weeks are eligible for one monthly payment
- D3 drought at any time are eligible for three monthly payments
- D3 drought for at least four weeks or in D4 at any time are eligible for four monthly payments
- D4 drought for four weeks, including non-consecutive weeks, are eligible for up to five monthly payments

One month's payment for losses due to drought is 60% of either monthly feed costs of livestock owned or of the normal carrying capacity of the land, whichever is less. Notably, livestock sold due to drought in the two years before the current production year are eligible for 80% of the monthly payment rate. Monthly feed costs are calculated by:

$$\textit{Monthly feed cost} = 30 \textit{ days} \times \textit{feed grain equivalent} \times \textit{corn price per pound} \quad (1)$$

The feed grain equivalent is equal to 15.7 pounds of corn per day for an adult beef cow. Corn price per pound is determined by dividing (1) the higher of the simple average of the national monthly corn price per bushel for the 12-month period immediately preceding March 1 of the year for which the disaster assistance is calculated or for the 24-month period immediately preceding that March 1 by (2) 56. For context, the monthly payment rate for adult beef cattle in 2022 was $47.29. Producers cannot receive LFP payments for more than five months for the "same kind, type, and weight range of livestock" (USDA, 2019). The 2018 Farm Bill maintained an annual payment limit for LFP of $125,000 per person or legal entity, disregarding any other program, for 2019 and subsequent years.

Although a number of risk management tools are available, producers must make a litany of decisions when managing a cattle ranch. Specifically, during times of drought, management decisions are critical to the continued operation of the business. Although there are several different options that a ranching operation could utilize in the case of a drought, three of the more popular scenarios are:

- **Purchasing supplemental feed**—During short periods of drought, producers may choose to purchase feed to supplement scarce forage. This feed may be in the form of forage (alfalfa or grass hay), protein (dried distillers' grains or cubes), or both. The amount of feed needed will depend on the severity of the drought, the body condition of the herd, and the dietary nutrients being supplemented (Carpenter and Hart, 2021). There are a few drawbacks to this scenario. The longer the drought persists, the more severe it becomes; thus, purchasing feed becomes significantly more expensive as the forage does not replenish and eventually ceases to exist, perhaps with irreparable damage to soil conditions (van de Koppel and Rietkerk, 2000). This strategy is normally used until it rains, or until the producer decides to adopt one of the other strategies.
- **Reducing stocking rates (culling)**—Díaz-Solís et al. (2009) and Bidwell and Redfearn (2020) emphasize that in drought, stocking rates must be reduced. When reducing the stocking rates, Carpenter and Hart (2021) posit that open cows should be culled first, followed by lactating females in poor body condition, as they likely won't calve again.
- **Relocation**—During prolonged drought, this strategy calls for moving cattle to a pasture outside of the drought area to ride out the drought. Several considerations need to be made when using this strategy: the construction of a pasture lease or rental agreement, restrictions if crossing state or county lines, and biosecurity measures if cattle are moved to a feedlot (Rasby, 2009; McCollum, 1999). If cattle are fed in confinement, as in a feedlot, less total feed would be required as less energy is spent and the feed is more energy dense than forage; however, these cattle would not be eligible for LFP payments, as cattle fed in confinement are ineligible for LFP.

With drought ravaging more than half of the United States in 2022, it's absolutely vital that livestock producers use all of the tools at their disposal. Doing so requires examining the interaction between LFP and the management decisions made by cattle producers. While that is the focus of this study, our analysis also highlights shortcomings of LFP that can help inform policy makers as they negotiate the next farm bill.

METHODS

To analyze the interaction between LFP and the various management options listed above, we utilize a case study ranch. The Agricultural and Food Policy Center (AFPC) at Texas A&M University maintains 94 representative crop, livestock, and dairy farms in 30 different states, 10 of which are cow-calf operations. Information used to simulate the economic activity on these operations is developed through a consensus-building interview process with a panel of producers. Projected prices and input inflation rates are provided by the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri. Financial statements are provided to the panels for their respective operations, and they are asked to verify the accuracy of the simulated results for each year and for a five-year projection (Outlaw et al., 2021). The King County Ranch (TXRB400, shown in Figure 1) was chosen for this study, in part because cattle are the primary enterprise on the operation. Additionally, the ranch is in the heart of the area affected by the 2011–2015 drought and was

eligible for five months of LFP payments in 2022 due to prolonged D4 drought (Figure 2).

For the case study ranch, we project the financial health of the operation for five years, beginning with 2022. We calculate the expected net present value (NPV) for the five scenarios highlighted in Table 1: baseline during a normal year; feeding, culling, and relocating during a three-year drought with LFP payments; and relocating during a three-year drought without LFP payments. Although LFP payment rates were calculated using the formula above—using monthly average prices over a one- and two-year period—this study simply uses annual averages provided by FAPRI. The ranch is organized as a corporation, and the tax implications of each scenario are incorporated accordingly.

Stochastic simulation was used to account for risk in projected revenues and costs to give a full picture of the risks facing the operation. The ranch was assumed to already be in D4 drought and eligible for the maximum five months of payments (consistent with reality in King County in 2022). We also assume that the drought persists for three years as noted in Table 1. In both the feeding and culling scenarios, the rate of feed purchased is assumed to increase as forage is depleted. For the cull scenario, after a year of drought, 25% of the herd was culled, and the following year, another 25% was culled. After the drought ended in the third year, 25% of the original herd size was bought back, and in the fifth year, the remaining 25% was purchased to bring the herd back to its original size. The relocation scenarios followed the same structure as the culling scenario, except cattle were relocated instead of sold.

FINDINGS

Figure 3 illustrates the expected NPV for the ranch under each scenario. LFP payments are triggered only in years of drought; for example, when the ranch was buying back cattle or bringing cattle back to the original ranch area, LFP payments were received only for cattle sold due to drought. Of all the strategies employed during a three-year drought, relocation with LFP payments had the highest expected NPV, followed by culling and feeding, respectively. Even with LFP payments not factored in, the expected NPV for the relocation scenario is higher than feeding through a three-year drought with LFP. Perhaps most importantly, LFP does not restore the ranch to the baseline outlook regardless of the management approach chosen. And, in the case of feeding through the drought—which many ranches may try to do as they endeavor to hold on to precious seedstock—LFP falls the shortest in terms of helping offset the costs incurred by the ranch. This shortfall grows even more pronounced as drought persists.

Figure 4 illustrates the cumulative distribution functions (CDFs) for NPV for all five scenarios. CDFs provide a depiction of the full range of possible outcomes—and the risk associated with each—for each scenario. Out of all scenarios (other than the baseline), relocation with LFP provides a consistently larger expected NPV. When the management response is to feed through the drought, there is a greater than 20% chance that the NPV will be negative, despite LFP payments. Culling in response to the drought results in an 8% likelihood that the NPV will be negative; by contrast, with relocation including LFP, NPV is negative only 0.2% of the time. To provide context, without LFP payments factored in, the relocation scenario results in negative NPV 16% of the time. Naturally, the success of relocation is highly dependent on diesel prices, hauling rates, and management expenses, as well as on finding a location outside of the drought region to which the cattle can be moved. In the case of TXRB400, relocation was the option used during the drought of 2012; this analysis utilized the same alternate location.

CONCLUSIONS AND SUMMARY

When facing drought, agricultural operations must make critical management decisions to ensure the viability of the operation. With LFP payments included, the optimal option for this ranch was to relocate cattle to an area outside of the region affected by drought. The next best option was to cull the herd and buy it back after the drought had ended. Although the purpose of LFP is to compensate for supplemental feed, feeding through the drought proved to be the most expensive option, despite the inclusion of LFP payments.

Although LFP provides a safety net for livestock producers, it does not make them whole, regardless of the management strategy used. If LFP is revisited in the next farm bill, policy makers may wish to consider increasing payment rates, particularly for operations facing long-term drought. The results also highlight the need for additional research—for example, exploring incorporating the cost of additional feedstuffs such as hay into the LFP calculations, expanding the number of payments beyond five months for prolonged drought, and examining interactions with other risk management tools such as PRF.

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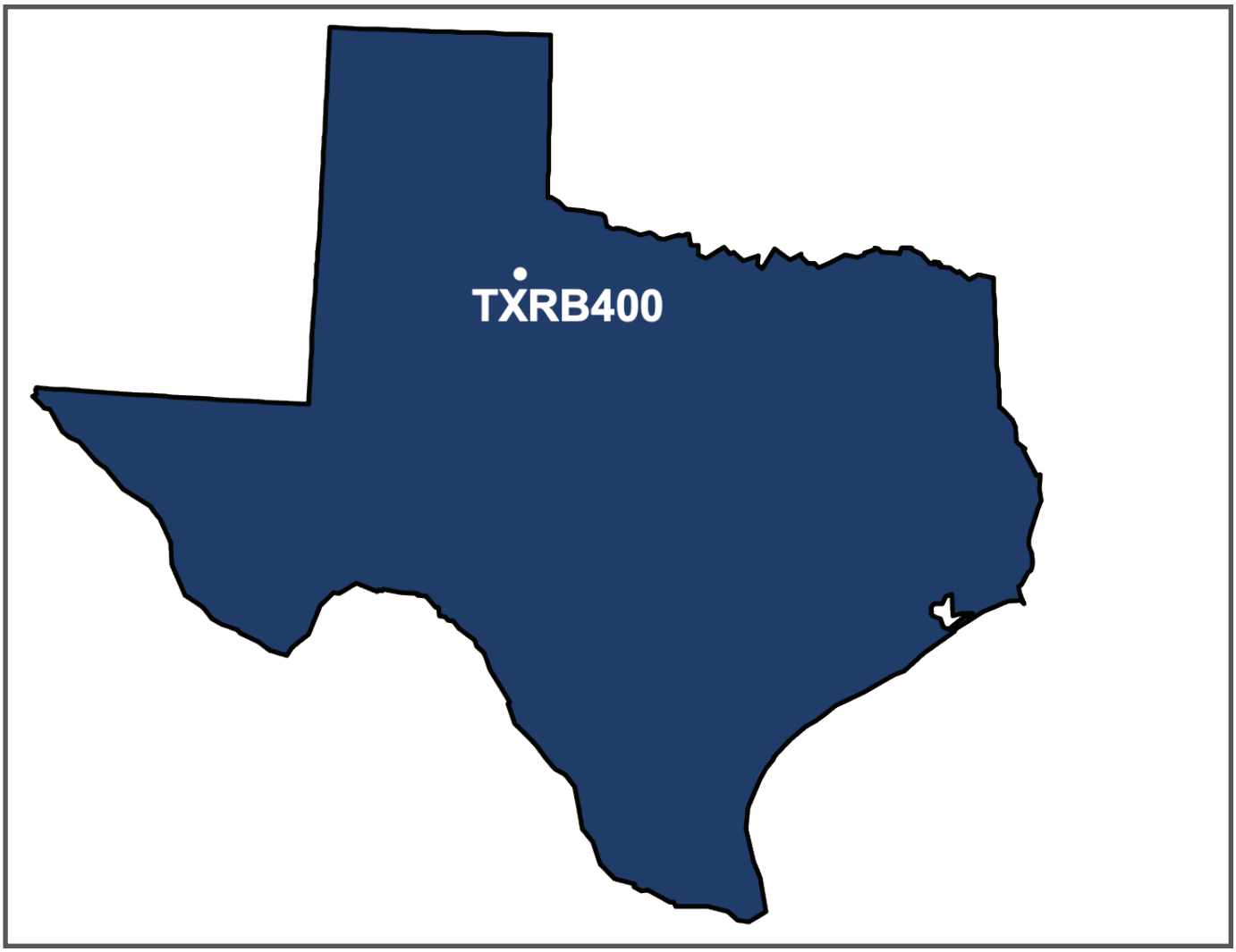

Figure 1. AFPC representative ranch location

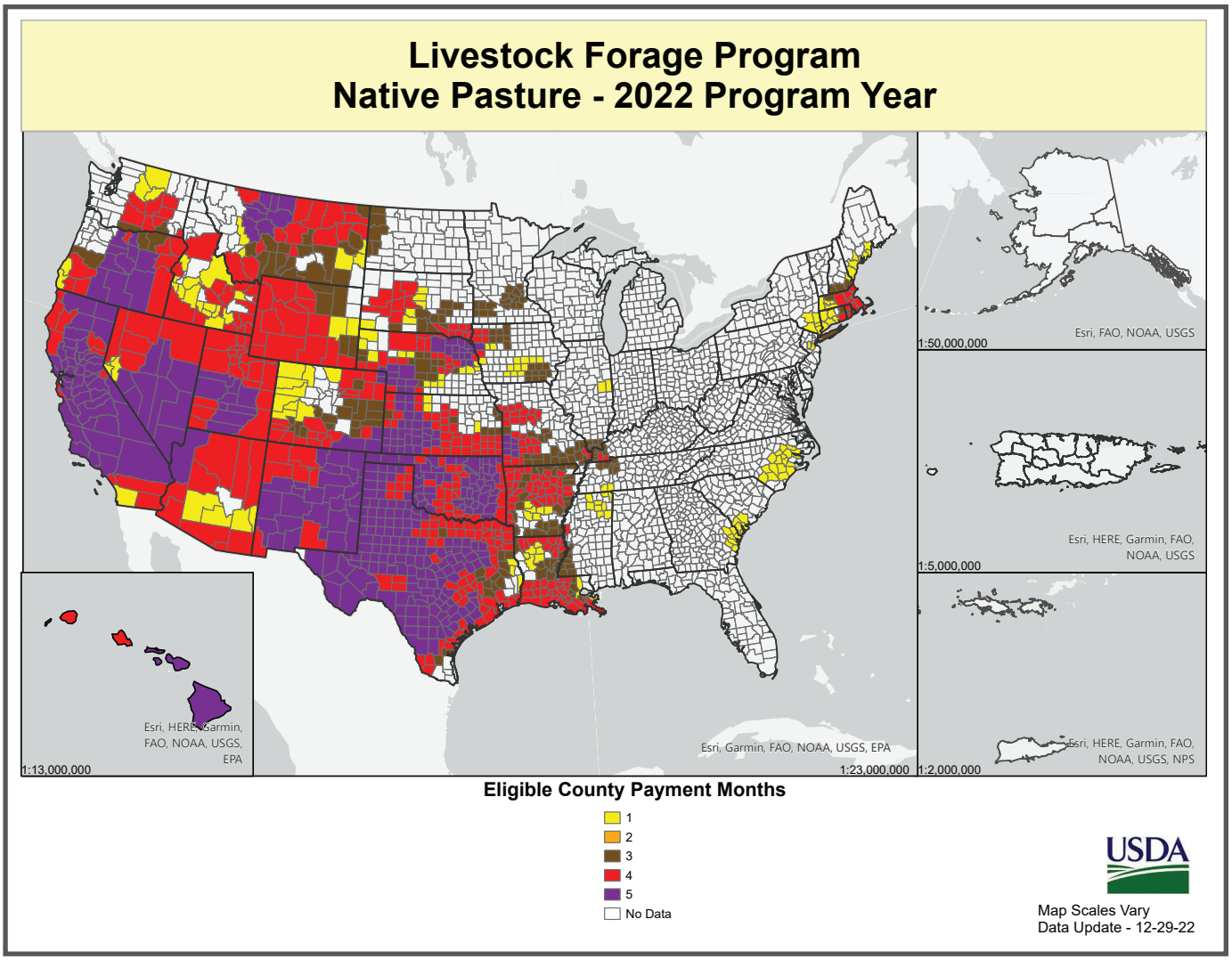

Figure 2. LFP native pasture payment months by county—2022 program year. (Source: https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/Disaster-Assist/LFP-Maps/2022/native_pasture_2022.pdf.)

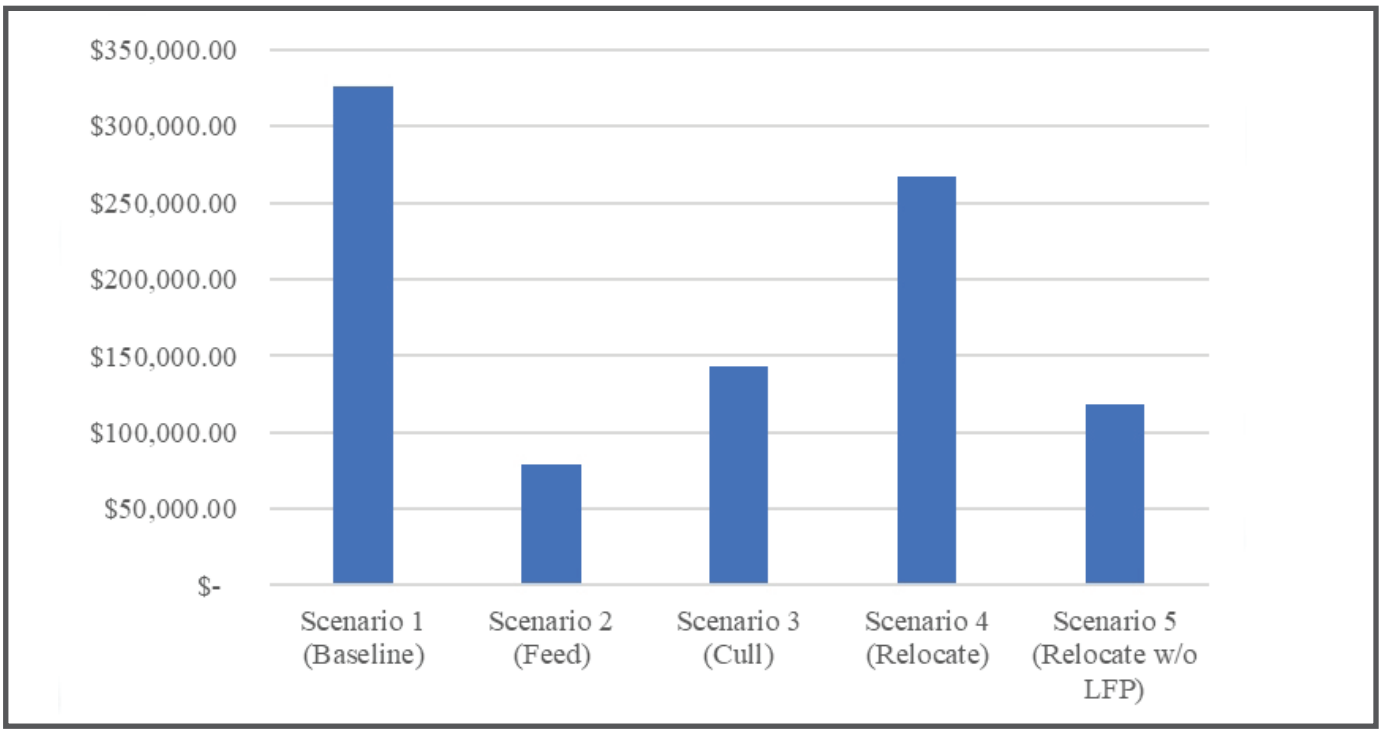

Figure 3. Expected NPV for various drought management scenarios

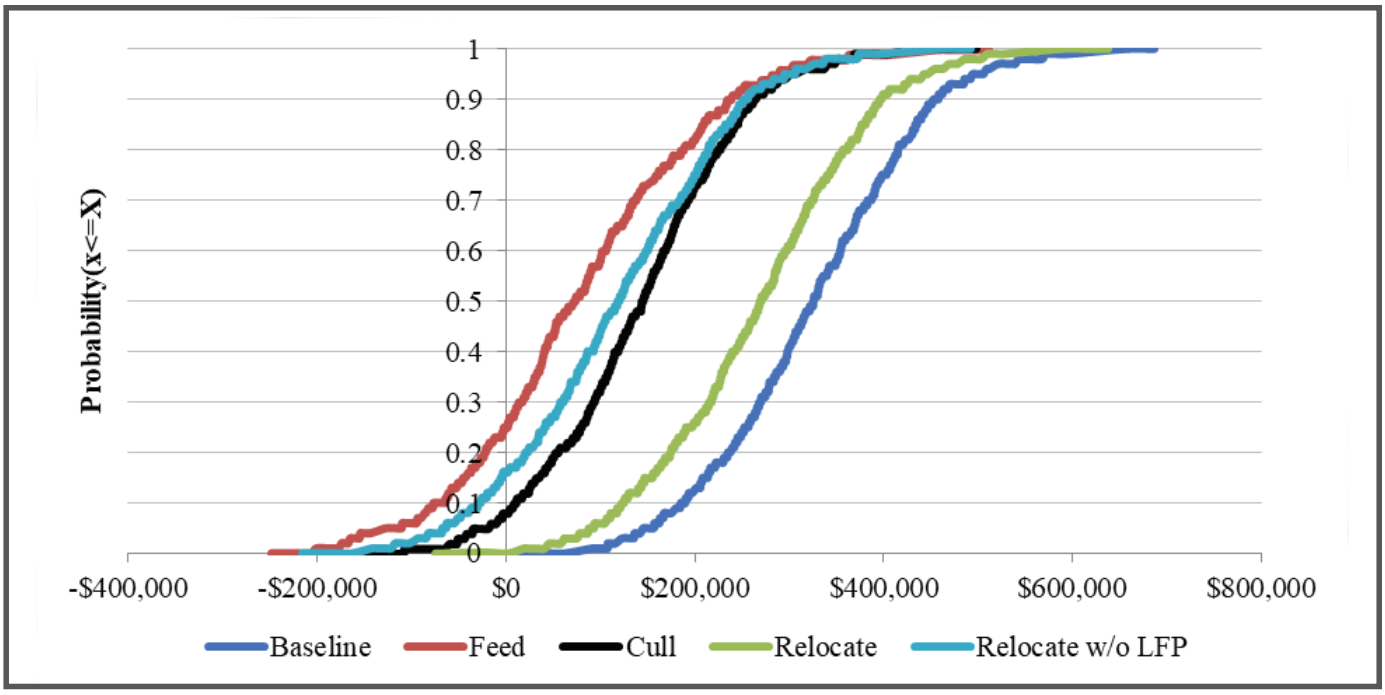

Figure 4. NPV CDF for various drought management scenarios

Table 1. Description of Scenarios					
Scenario	1	2	3	4	5
Drought Length (Years)	0	3	3	3	3
Management Response	N/A	Feed	Cull	Relocate	Relocate
LFP Payments	No	Yes	Yes	Yes	No