A rizona is no stranger to drought and August 2017 through June 2018 proved to be a very trying dry spell for securing adequate water and forage nutrition for cattle in much of our state. The costs associated with feeding hay and hauling water during drought are very substantial, yet the costs associated with selling cows and trying to buy back suitable breeding stock can be even more daunting. To address the economics of culling cows during drought, we analyze data related to cow productivity by age, market conditions and also the costs associated with feeding hay and pumping water on the University of Arizona’s V Bar V ranch during our most recent dry spell.

Cow Productivity by Age

While a few “super cows” can consistently produce a calf year-after-year until they are up to around 15 years of age or even a bit more, the average cow starts to decline in productivity by producing lower calf weights around age 7.5 and declining in their own weight around age 9, as described in figure 1. Fertility, or the odds that a cow will breed back is also very crucial to the economics of culling as an open cow is not going to produce a sale calf next year, even though she may be gaining weight and has a chance of conceiving as an open cow is not going to produce a sale calf next year, even though she may be gaining weight and has a chance of conceiving and producing a calf in the more distant future. Figure 2 describes cow fertility data observed by age from the San Carlos Apache Tribal registered Hereford herd (5,000 to 6,000 feet elevation).

Herd Management Strategies for Drought

During periods of extended drought, strategies to preserve the base breeding herd include everything from early weaning calves to culling older cows to feeding hay and hauling water. Early weaning works because lactation roughly doubles the daily energy and protein requirements needed for a typical beef cow. Removal of the nursing calf at 6 to 8 weeks also causes hormonal changes that allow the estrus cycle to begin so cows can breed back. In order to maintain a 365-day calving interval, calves should be early weaned or sold prior to being weaned somewhere between 40 to 80 days of age (Glenn Selk, Oklahoma State University). One of the disadvantages of early weaning is that if ample forage becomes available from subsequent rains, the rancher will be unable to fully capitalize on converting forage to sale calf weight as early-weaned calves require a concentrated grain diet that can typically only be provided in a confined feeding setup.

Hauling water and feeding hay is a strategy that is also implemented to weather the storm of a drought. Some advantages of this strategy are keeping cows with genetics that you have selected over the years and that have learned where to find the best forage on your ranch. In addition, if monsoon rains come so that dirt tanks are restored with ample stock water and green grass returns, compensatory gains are likely to occur for both cow and calf. A risk associated with hauling a cow to market during an extended drought is that you will receive a somewhat regionally depressed drought slaughter price. But when drought conditions improve or are broken, you will need to buy another cow with unknown disease and genetic characteristics at regionally heightened replacement prices or wait for a replacement heifer to fill her spot in the herd.

A disadvantage associated with trying to feed hay and haul water through an extended drought is that the daily maintenance costs are very high compared to grazing forage and no one ever knows for certain when drought conditions will end. This last May, the University of Arizona’s V Bar V Ranch made the decision to move all their cattle to 40 acres of private land at Mahan Park and feed hay and protein-mineral tubs and pump water in anticipation of monsoon rains coming in July. Even though ample dry forage was available, insufficient water was available in dirt tanks and hauling water was not feasible as most of the ranch is only accessible via rough jeep trails. Sudan grass and beardless wheat hay was purchased at $2.15 per ton and each cow was fed about 20 lbs. per

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day ($2.15/day per cow). Protein-mineral tubs were fed at a rate of about 0.5 lbs. per cow for each day and purchased at $1,250 per ton ($0.31/day per cow). Water costs associated with fuel to run a generator and pump water amounted to $0.06/day per cow. In total, $2.52/day per cow was expended to take cows off their Forest Service grazing permit for the 50 days from June 4 to July 23. On average, a total of $126/head was required for water and feed to get through the tail end of our extended drought period.

How profitable was this strategy of feeding hay and pumping water versus culling cows? In May, replacement prices for young cows at auctions in Arizona were around $965/head while cull values of presumably older cows were estimated to about $750/head, (1150 lbs. * .65/lb.), resulting in a $215/head difference. Sale calf prices in the 400 to 600 lb. range were going for about $175/cwt. To evaluate the profitability of feeding versus culling cows, we consider market conditions as well as the age of the cow using the Arizona Ranchers Management Guide article on Value of Pregnancy Testing (Tronstad and Gum, cals.arizona.edu/arec/publication/arizona-ranchers-management-guide-ranch-business-management) while adjusting pricing to current 2018 dollars using the all-goods Consumer Price Index series.

For cows greater than 9.25 years of age, we find that the difference between culling this group of cows and not replacing them versus keeping these cows to be about $98/head. Thus, for any older cows that were not already culled, the $126/head average cost of feeding may have exceeded what these cows would be expected to contribute in future productivity given the biological relationships described in figures 1 and 2. However, for cows that are less than keeping them on their average productivity trajectory amounts to $212/head. Thus, without accounting for any costs associated with purchased cattle bringing a new disease on the V Bar V or these cattle becoming acclimated to the V Bar V range conditions, providing feed and water was at least $86/head more profitable than culling these cows.

Next, we consider a scenario where all cows in the herd have the same productivity with an 85% breed back rate, 525 lb. calf sale weight and a calf price of $175/cwt. Under these general productivity conditions, the cost associated with feeding for 50 days at $2.52/day per cow as the V Bar V did is about equal to the cost associated with being forced to destock 9% of the cow herd, assuming that replacements can be purchased after six months at current market prices and productivity remains constant for the cattle remaining in the herd. However, extended drought conditions will likely require that any remaining base herd will require water and at least protein supplement to weather through the drought until rain and forage conditions improve. Drought is very costly to ranchers. Just a 15% drop in cow fertility for one-year without having to destock any cows can easily amount to over a 30% decline in profitability for the subsequent year, depending on the baseline level of profit for the ranch. But being forced to destock 50% of the cow herd for just one year is likely to run most ranches in the red for several years in the future.

How long drought will persist is the critical risk and factor in trying to decide on whether to feed and provide water. If the monsoon season would have been a fizzle and the V Bar V was in the position of still feeding and pumping water to their cattle for upwards of 100 days, then one would be in the precarious position of having sunk a
fair bit of feed and water expense into the cattle and still waiting for rains to come. But given that the monsoon rains have come through for Arizona this July, no replacement cows are even available at our Arizona auction yards looking at recent market reports. Thus, in analyzing whether to cull cows or feed and water them through a drought, one should probably plan and budget for the extra transportation costs of purchasing replacement cattle from out-of-state when selling a large portion of their base herd. If you have registered cattle or even commercial cattle with an extensive set of records collected over the years, the best option may very well be to pay for trucking and rent pasture out-of-state during an extended drought as your selected genetics and history are very difficult to replace and valuable.

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Pasture Rangeland Forage - Rainfall Index was first made available to Arizona ranchers in 2016 through USDA’s Risk Management Agency. Individuals with the right to graze on acreage can purchase insurance on the level of rainfall that is expected to occur within a grid that is approximately 17x17 square mile grid. An index of historical rainfall levels from 1948 to present are constructed using NOAA Climate Prediction Center weather data by using 4-point interpolation such that closer weather stations to a grid receive more weight than more distant locations. The rainfall index does not measure or capture the actual forage production within an area, but the index is designed to insure against a decline in its value relative to the its long-term historical value for an area of land for the same seasonal time period. Eleven 2-month time intervals can be insured for that are the months of January and February; February and March; and so on through November and December. A rainfall index value of 100 represents average precipitation received since 1948 while values below 100 are less than average precipitation.

Indemnity payments are made to insured producers when the realized grid is less than the index grid insured for. This is often referred to as the trigger grid index. Insurance can be purchased for index levels as high as 90 percent and the subsidy rate on most policies is around 50 percent. Because indexes are continuously being calculated and updated on a monthly basis, insured producers to not even need to file for a claim or substantiate any losses.

Three workshops that will address Pasture Rainfall Forage – Rainfall Index are being offered:
• September 7, Benson
• September 11, Santa Rosa
• September 14, San Carlos

Please contact Ashley Wright (awright134@email.arizona.edu or 520-766-3605) or Russ Tronstad (tronstad@email.arizona.edu or 520-621-2425) for more information on these drought management workshops offered by The University of Arizona, Cooperative Extension.