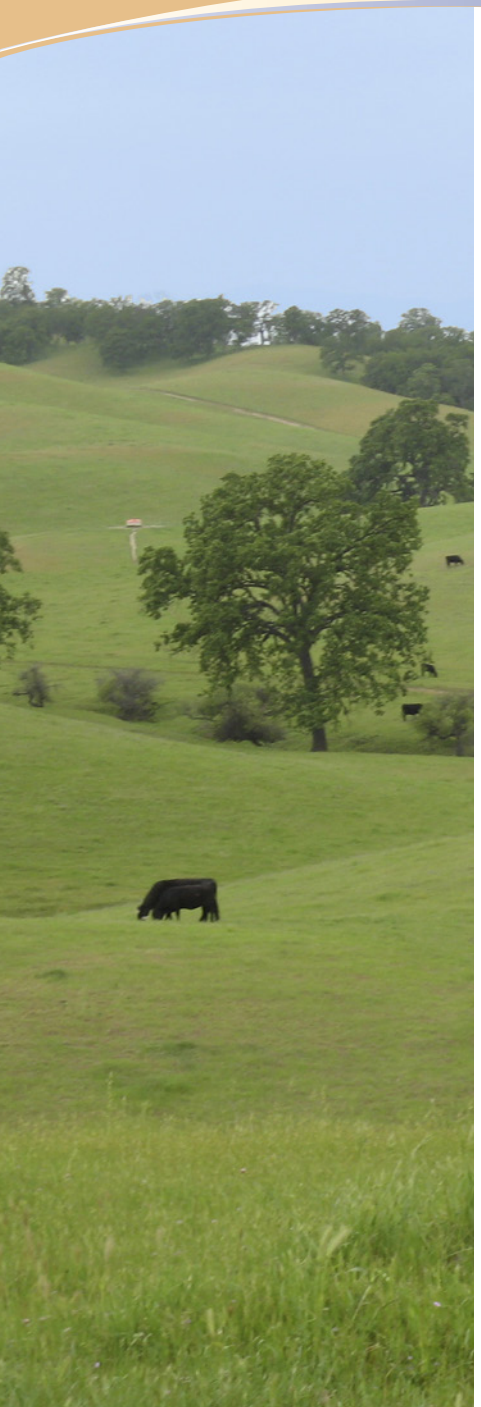
University of California
Agriculture and Natural Resources

ANR Publication 8563 | March 2016
http://anrcatalog.ucanr.edu
UC PEER REVIEWED



DROUGHT TIP

# Drought Strategies for Feeding Cattle Grazing Annual Grassland

JOSH DAVY, University of California Cooperative Extension Livestock, Range, and Natural Resources Advisor, Tehama County;
LARRY FORERO, University of California Cooperative Extension County Director, Shasta County;
JEFFERY STACKHOUSE, University of California Cooperative Extension Livestock and Natural Resources Advisor, Humboldt County;
GLENN NADER, University of California Cooperative Extension Livestock and Natural Resources Farm Advisor Emeritus, Sutter-Yuba Counties

**Drought leads to predictable lack of forage** production on rangelands. This leaves two possible management scenarios: sell animals to reduce forage demand, or supplement feeding to maintain herd genetics. In some cases producers may choose a combination of both to prevent complete herd dispersal. This publication is designed to help producers think through the supplementation of cattle during drought years.

During drought it is imperative to reduce grazing pressure on rangelands to avoid causing subsequently diminished production in the years following drought. If the amount of supplementation required to sustain the animals exceeds 50% of the diet, it ceases to be supplemental feeding and becomes replacement feeding. If replacement feeding is necessary, the best option is often to bring cattle to a holding field to feed them. This preserves the dry forage remaining on rangelands, which acts as a mulch that reduces runoff and increases infiltration when rains come. This residual dry matter (RDM) will be the most important factor for range recovery once rains return. To determine whether adequate amounts of RDM are left for range recovery, see *Guidelines for Residual Dry Matter on Coastal and Foothill Rangelands in California* (ANR Publication 8092), http://anrcatalog.ucdavis.edu/pdf/8092.pdf.

## Consider the Stage of Cow Production

The quantity and nutrient value of supplemental feed necessary varies based upon the production requirements of the cow. The peak nutritional demand for a cow occurs 60 days post-calving. As the calf grows, milk production decreases,

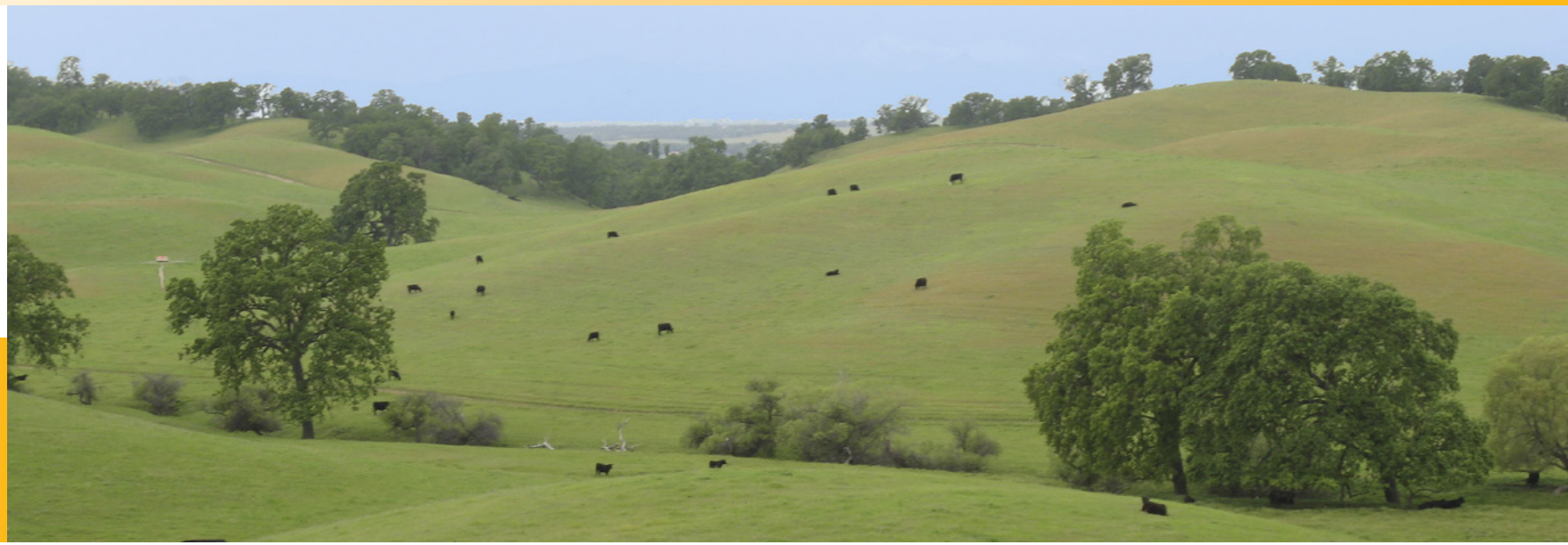


**Figure 1.** Conserving the forage on rangeland is imperative for drought recovery once rains return. *Photo: Josh S. Davy.*

along with the cow's nutritional requirements; however, the calf begins to require forage to meet its maintenance and production requirements. Generally, a dry cow has the lowest feed requirement. This is important because having an adequate body condition at calving is the most important factor in a cow's subsequent rebreeding (Richards et al. 1986). The stage of cow production can be manipulated by management through the selection of the calving season. For example, if summer pasture is adequate, calving can be done in the spring so that the cow is not lactating during the fall, winter, and early spring of the annual rangeland season. This is the very first consideration prior to supplementing.

## Cost and Ration Development Considerations

When considering the decision to cull or feed, the cost of supplemental feed must be considered first. This cost can be applied against economic factors that include the increased weight of weaned calves before selling, as well as the cost of replacing genetics when cows are sold. It is important to consider the anticipated market price for cattle at the time of marketing. Generally, heavier cattle are worth less on a per-pound basis (Blank et al. 2006), making it imperative to consider this value difference in addition to the cost of gain.

When considering supplemental feeds, the cost per ton is not a good criteria for comparing different types of feeds. Cost per ton does not account for the varying nutrient values of diverse feeds. For example, almond hulls are almost always cheaper than corn; however, the energy value of almond hulls is about 52% total digestible nutrients (TDN) (roughly the same as oat hay), compared with corn, which is about 88% TDN (NRC 2000). This means almond hulls provide roughly 59% of the amount of energy as corn when fed at the same rate.

Moisture, or the dry matter content, is also important to consider when comparing feed costs. Rations are formulated on a dry matter basis, so the water content should be viewed as a reduction in the actual product. Most concentrate grains are very low in moisture (88–91% dry matter), while fresh grass silage is high in moisture content (25–35% dry matter). Comparisons should be made on the bases of similar dry matter value. For example, if two products cost $200 per ton and one is 90% dry matter while the other is 25%, the product with 90% dry matter actually costs $222

per ton of dry matter. Conversely, the product with only 25% dry matter actually costs $800 per ton of dry matter feed.

When determining the appropriate supplement, energy, protein, and often calcium need to be considered. For example, corn is high in energy but low in protein and calcium, whereas canola meal and cottonseed are high in both protein and energy and have higher calcium than most other concentrates.

## Ration Balancing Software

Ration balancing software can help determine the appropriate supplement for a given situation for a given production scenario. It is important to determine the cost and availability of supplement options as well as the animal production parameters (dry cow, pairs, etc.) prior to sitting down at the computer. The University of California has developed a ration balancing program available called Taurus (http://animalscience.ucdavis.edu/extension/Software/index.htm). A demonstration version of the program is available for free download. The Taurus program can evaluate a current ration or develop a least-cost ration for most cattle production scenarios. Most University of California Cooperative Extension offices have copies of the program and livestock farm advisors who can assist with ration formulation. While rations can be balanced by using reference tables and a calculator, using computer software allows a producer to consider many options quickly.

## Alternative Feeds

When comparing commodity costs, many producers consider nontraditional feeds. These nontraditional feeds can save money when other roughage or concentrate costs are high. Recent improvements in the methods of baling rice straw have improved its feed intake and nutrient availability, potentially providing a low-cost roughage source that could be supplemented with small amounts of concentrates. The rich diversity of crop production and food processing in California provides options for many other "by-product" alternative feeds. Examples include cull fruits and vegetables, fruit pomace, citrus pulp, brewers' grains, distillers' grains, and many others.

### *Ability to Store and Handle Alternative Feeds*

Concentrate-type feeds are efficient because they contain high amounts of protein and energy compared with roughages, but they are typically more difficult to handle. The difficulty for many ranching operations is storing these feeds and delivering them to cattle in the quantity specified by the ration. Most concentrate supplemented rations only include 4 to 9 ponds of grain per head on a daily basis. Many types of feeders can help keep grain off the ground, such as long feed bunks and conveyor belts rolled out over the ground. If equipment designed to meter out grain by weight is not available, the added labor to deliver the appropriate quantity must be considered before purchase.

### *Gradual Adjustment to Alternative Feeds*

If drought reduces the growth and quality of annual forage during the winter, cattle may consume lower-quality dry forage left over from the season before. This makes it very important to introduce high-quality concentrate or hay feeds gradually rather than all at once. Sudden shifts in feed quality can cause health problems, including acidosis and reduced feed intake (Owens et al. 1998; Uhart and Carroll 1967). Producers should work up to the final concentrate ration by slowly increasing rations over a two-week period. Feeding whole concentrates rather than cracked or rolled make the product slightly less digestible and can help limit potential problems. Adding an ionophore to the ration can also help reduce the risk for bloat and increase efficiency (Kunkle et al. 2000). Additionally, research has measured equal performance in cattle fed concentrate energy supplements one to three times per week as compared to daily (Kunkle et al. 2000).



**Figure 2.** Serum and whole blood sampling cattle for mineral and vitamin A status can be especially important during drought. *Photo:* Josh S. Davy.

## Freight Costs

When pricing commodities it is very important to consider the delivery cost. This cost must be added to the per ton cost of the feed being considered. Freight has a direct impact in determining a least-cost ration. Most feed companies are able to provide an estimated freight cost per ton based on the distance between the ranch and the feed mill. Pricing is usually discounted by purchasing large quantities. Smaller operators might consider partnering with neighbors to make large enough orders to receive the discounted pricing.

## Vitamin A

Livestock obtain vitamin A from carotene in green forages, which includes most hay sources. Vitamin A deficiency occurs when poor-quality hay is fed, or when cattle graze dry grass such as RDM that is low in carotene (Frye et al. 1991). Cattle can store vitamin A in the liver, so deficiency does not generally occur unless green feed is not available over a long time period. Problems caused by Vitamin A deficiency are most commonly seen in fetuses and calves. Abortion is a common concern (NRC 2000). Blood serum sampling, particularly of pregnant replacement heifers, is the best method to assess vitamin A deficiency. Supplemental vitamin A in mineral mixes may not last very long when exposed to sunlight; injectable vitamin A can alleviate part of the deficiency.



**Figure 3.** Freight should always be added to the per ton cost of supplemental feeds. *Photo:* Glenn A. Nader.

## Excess Protein

Adequate protein is essential for all classes of cattle, but excess protein in the diet can be detrimental to reproductive performance (McCormick et al. 1999). Protein in the diet should be monitored closely, especially when high-nitrogen supplements such as urea are included in the diet. Most problems occur when cattle have access to high-protein feeds such as pasture clover or filaree and are simultaneously provided high-protein supplements.

## Conclusion

Managing cattle during drought is a balancing act of culling cattle to enhance future range recovery and providing cattle supplemental feeding to prevent complete herd liquidation. In even the most severe drought, a combination of culling and feeding is most likely to help preserve the ranching enterprise.

## References

Blank, S., H. Boriss, L. Forero, and G. Nader. 2006. Western cattle prices vary across video markets and value-adding programs. California Agriculture 60(3): 160–165.

Frye, T. M., S. N. Williams, and T. W. Graham. 1991. Vitamin deficiencies in cattle. Food Animal Practice 7(1): 217–275.

Kunkle, W. E., J. T. Johns, M. H. Poore, and D. B. Herd. 2000. Designing supplementation programs for beef cattle fed forage-based diets. Journal of Animal Science 77 (E-Suppl.): 1–11.

McCormick, M. E., D. D. French, T. F. Brown, G. J. Cuomo, A. M. Chapa, J. M. Fernandez J. F. Beatty, and D. C. Blouin. 1999. Crude protein and rumen undegradable protein effects on reproduction and lactation performance of Holstein cows. Journal of Dairy Science 82:2697–2708.

NRC (National Research Council). 2000. Nutrient Requirements of Beef Cattle. Washington, DC: National Academy of Sciences.

Owens, F. N., D. S. Secrist, W. J. Hill, and D. R. Gill. 1998. Acidosis in cattle: A review. Journal of Animal Science 76(1): 275–286.

Richards, M. W., J. C. Spitzer, and M. B. Warner. 1986. Effect of varying levels of postpartum nutrition and body condition at calving on subsequent reproductive performance in beef cattle. Journal of Animal Science 62(2): 300–306.

Uhart, B. A., and F. D. Carroll. 1967. Acidosis in beef steers. Journal of Animal Science 26(5): 1195–1198.

## For More Information

This publication was written and produced by the University of California Agriculture and Natural Resources under agreement with the California Department of Water Resources (DWR). It is an update of Drought Tip 92-04, which was part of a publication series developed as a cooperative effort by the California DWR; University of California; USDA Drought Response Office and Soil Conservation Service; and the U.S. Department of the Interior Bureau of Reclamation, Mid-Pacific Region.

To order or obtain ANR publications and other products, visit the ANR Communication Services online catalog at http://anrcatalog.ucanr.edu/ or phone 1-800-994-8849. You can also place orders by mail or FAX, or request a printed catalog of our products from

University of California
Agriculture and Natural Resources
Communication Services
1301 S. 46th Street
Building 478 – MC 3580
Richmond, CA 94804-4600

Telephone 1-800-994-8849, 510-665-2195
FAX 510-665-3427, E-mail: anrcatalog@ucanr.edu

©2016 The Regents of the University of California. This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-nd/4.0/ or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

Publication 8563

ISBN-13: 978-1-60107-962-6

The University of California, Division of Agriculture and Natural Resources (UC ANR) prohibits discrimination against or harassment of any person in any of its programs or activities on the basis of race, color, national origin, religion, sex, gender, gender expression, gender identity, pregnancy (which includes pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), genetic information (including family medical history), ancestry, marital status, age, sexual orientation, citizenship, status as a protected veteran or service in the uniformed services (as defined by the Uniformed Services Employment and Reemployment Rights Act of 1994 [USERRA]), as well as state military and naval service.

UC ANR policy prohibits retaliation against any employee or person in any of its programs or activities for bringing a complaint of discrimination or harassment. UC ANR policy also prohibits retaliation against a person who assists someone with a complaint of discrimination or harassment, or participates in any manner in an investigation or resolution of a complaint of discrimination or harassment. Retaliation includes threats, intimidation, reprisals, and/or adverse actions related to any of its programs or activities.

UC ANR is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment and/or participation in any of its programs or activities without regard to race, color, religion, sex, national origin, disability, age or protected veteran status.

University policy is intended to be consistent with the provisions of applicable State and Federal laws.

Inquiries regarding the University's equal employment opportunity policies may be directed to: John Sims, Affirmative Action Contact and Title IX Officer, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1397. Email: jsims@ucanr.edu. Website: http://ucanr.edu/sites/anrstaff/Diversity/Affirmative_Action/.

An electronic copy of this publication can be found at the ANR Communication Services catalog website, http://anrcatalog.ucanr.edu/.

UC PEER REVIEWED

This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by ANR Associate Editor for Animal, Avian, and Veterinary Sciences Carol Collar.

web-03/16-SB/CR