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Forage: A Producers Guide to Drought Preparation, Management, and Recovery in the Southeastern United States



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ABOUT

“Forage: A Producers Guide to Drought Preparation, Management, and Recovery in the Southeastern United States” is one in a set of guides to help Southeastern United States producers of economically important agricultural commodities build resilience to, prepare for, manage, and recover from drought impacts. All guides are found on the USDA Southeast Climate Hub Drought Preparation and Recovery Commodity Guides website.

DISCLAIMER

This guide contains a compilation of information from multiple States in the Southeastern United States. Therefore, some links and resources may not be relevant or even appropriate for your location. Information in this document was provided by USDA and various university Extension staff and based on shared experiences preparing for and recovering from drought impacts; however, individual producer situations will vary. This guidance should not be interpreted as required actions by regulatory or insurance agencies. STATE OR LOCAL GUIDANCE/REGULATIONS AND INSURANCE POLICIES SUPERSEDE THE RECOMMENDATIONS IN THIS GUIDE. Check with your local Extension agent; county, State, or Federal contact; consultant; or insurance agent regarding the appropriateness of these recommendations for your specific situation.

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Cover photo: Hay bales gathered in a field. (Adobe Stock photo)



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Southeast Climate Hub
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Forage: A Producers Guide to Drought Preparation, Management, and Recovery in the Southeastern United States

THIS GUIDE WILL FOCUS ON:

- Building pre-drought resilience in forage production for pastures and hayfields
- Implementing adaptive management practices during a drought to minimize forage production losses
- Coordinating forage assessment and recovery efforts post-drought

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Introduction

Preparing for, managing, and recovering from drought events



Large circular hay bales after being harvested. (Courtesy photo by Lauren Husband, University of Arkansas System, Division of Agriculture)

Drought is a natural part of the Southeastern United States climate and a threat to agricultural productivity and profitability. Whether slow developing or rapid onset, drought can have severe impacts on crops and livestock depending on its timing, severity, and length. Droughts are expected to become increasingly common in the Southeastern United States due to increasing temperatures, longer dry periods between rain events, and growing water demand across the region.

To help producers remain resilient and productive in the face of this threat, the U.S. Department of Agriculture (USDA) Southeast Climate Hub and subject matter experts from university Extension and the USDA Natural Resources Conservation Service (NRCS), in collaboration with the U.S. National Oceanic and Atmospheric Administration (NOAA) National Integrated Drought Information System (NIDIS), developed this guide to help forage producers prepare for and recover from droughts. This guide is separated into three primary sections:

- **The Building a Resilient Operation (Pre-Drought)** section outlines adaptation initiatives and tools producers can use to prepare for and increase their resilience to drought.
- **The Adaptive Actions During a Drought** section considers important decisions to make in response to drought conditions. Well-prepared producers can rely on tools and adaptive protocols presented in this guide to help inform the decision-making process.

INTRODUCTION

- **The Drought Recovery (Post-Drought)** section outlines measures producers can take to minimize losses and seek out available assistance following a drought.

The guide also includes an appendix with:

- Two customizable templates for a **Drought Plan** and a **Contacts List**. The **Building a Resilient Operation** section outlines directions on what to include in these two documents as well as their use.
- **Initial Site Planning** guidance that can be referenced if purchasing or leasing new land.
- Federal, State, and Extension **Resource Links** to help inform short- and long-term decision-making. Many of these resources appear throughout the guide but are also included in appendix 4.

This guide's layout and how it is intended to be used can be found in figure 1. After recovering from a drought, producers should refer to the **Building a Resilient Operation** section and incorporate guidance and lessons learned into their management and farm emergency plans.

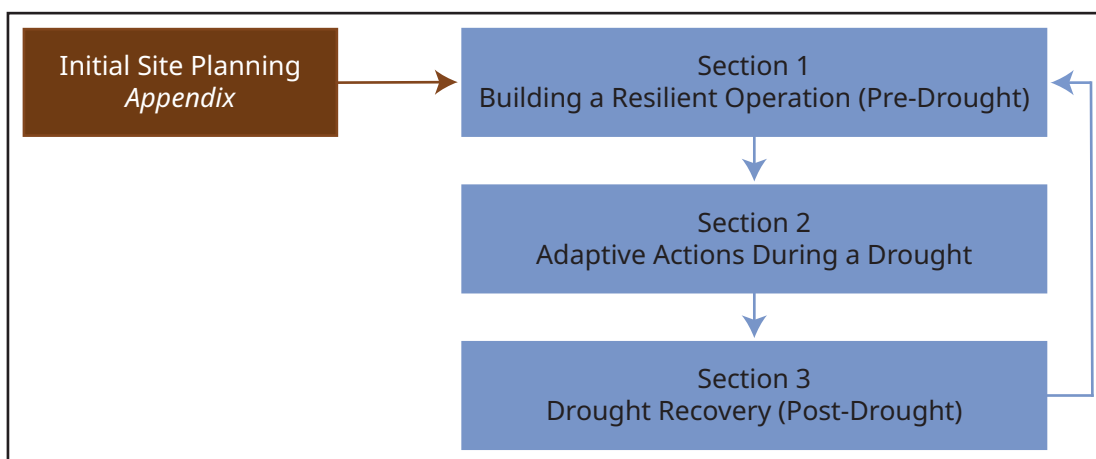


Figure 1—Layout and use of the drought preparation, management, and recovery guide.

SECTION 1

Building a Resilient Operation (Pre-Drought)

Practices that can be adopted well before a drought occurs to maintain productivity, reduce the risk of crop loss, and reduce recovery time



Large hay bales loaded on a trailer for transport. (USDA photo)

What is a resilient operation?

- A resilient operation adopts practices that help to mitigate potential drought and its effects. These include:
 - Working with technical service providers (e.g., Extension agents, NRCS field staff) to develop and implement a drought plan
 - Implementing rotational grazing to protect residual forage stubble at minimum heights
 - Adjusting stocking rate based on forage and weather conditions
 - Scouting often for symptoms of disease and implementing integrated pest management
 - Developing a comprehensive pasture management plan to maximize water resources, forage production, and soil health
 - Keeping pre- and post-drought records of crop conditions to aid with disaster assistance and insurance claims.

SECTION 1: BUILDING A RESILIENT OPERATION (PRE-DROUGHT)

- The recommendations in this guide have been shown to increase drought resilience when properly used during forage production in the Southeastern United States. To learn more about building resilience to drought on your farm, use the **Resource Links** in appendix 4 to find local Extension offices and other State and Federal resources that you may consult for further guidance.

Personal and worker safety

- Drought often occurs during periods of increased sun exposure and heat. Manual labor should be limited to early morning and late evening hours whenever possible to avoid heat-related illnesses.
- Clean, cool water should always be available for workers, as should a source of shade or air conditioning to allow for temporary relief from the sun and heat.
- To learn more about assessing levels of sun exposure and heat stress, see:
 - National Institute for Occupational Safety and Health, [OSHA-NIOSH Heat Safety Tool Application](#) (USDCDP 2025)
 - NOAA National Weather Service (NWS), [HeatRisk website](#) (USDC 2025a)
 - Southeastern Coastal Center for Agricultural Health and Safety, [Heat Stress website](#) (SCCAHS 2025)

Drought planning

- Episodic drought in the Southeastern United States is inevitable. The impact on forage can vary depending on the time of year that drought occurs (tables 1 and 2). Developing and maintaining a drought plan for your operation is an important step in being prepared.
- Work with your local Extension agent or NRCS office (or both) to develop a drought plan. Refer to the **Drought Plan** guidance in appendix 1 for a more detailed description of what should be included in the plan.

Drought monitoring

- Building resiliency on your land requires knowledge of current and forecasted weather conditions. Knowing the weather and climate data available to you and how to access the data are vital steps in preparing for, mitigating, and recovering from drought. Additionally, your experience managing your fields is an important factor because you know how your crops respond to the stress of dry conditions. This combination of data and experience will be most beneficial when drought arises.
- On-farm measurements of precipitation, temperature, and soil moisture, combined with experience, are the best ways to inform site-specific decisions.
- In addition to on-farm monitoring, the [U.S. Drought Monitor](#) (NDMC, USDC, USDA 2025) and the Drought.gov [U.S. Drought Portal](#) (USDC 2025b) are good places to find current drought information, outlooks, related data, and maps at the State, county, and other geographic

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SECTION 1: BUILDING A RESILIENT OPERATION (PRE-DROUGHT)

Table 1—Warm season perennial forage dominant areas: anticipated drought impacts and considerations during drought planning

| | Growing | Grazing and Harvesting | Post-Grazing and Post-Harvesting | Overseeding with cool season annuals |
|---------------------------------|--|---|--|---|
| Drought impacts | <ul style="list-style-type: none"> • Delayed fertilizer application • Reduced effectiveness of herbicides and insecticides • Delayed results from lime application | <ul style="list-style-type: none"> • Delayed/reduced plant growth • Reduced yield • High crop loss • Increased insect damage • Reduced effectiveness or increased injury from herbicides | <ul style="list-style-type: none"> • If middle of the growing season, refer to “Drought impacts” under the “Growing” column • If end of growing season, refer to “Drought impacts” under “Overseeding with cool season annuals” column | <ul style="list-style-type: none"> • Reduced soil moisture • Delayed germination • Stunted growth |
| Crop management actions | <ul style="list-style-type: none"> • Measure forage yield • Scout for weeds and insects • Modify fertilizer applications • Reduce stocking rate • Choose sacrifice lot areas • Develop irrigation strategy (if applicable) | <ul style="list-style-type: none"> • Adjust grazing or harvest timings • Utilize sacrifice lots | <ul style="list-style-type: none"> • Update forage and stored feed inventories • Make storage decisions for stored forages • Inspect stubble height • Test forage quality • Test soils | <ul style="list-style-type: none"> • Irrigation system repair and maintenance • Ordering agrichemicals for next growing season • Soil improvements • Weed control |
| Decision-making resource | <ul style="list-style-type: none"> • Short- and long-term drought outlook • El Nino Southern Oscillation (ENSO) forecast • Local forecast • Soil moisture maps • Extension decision support tools | <ul style="list-style-type: none"> • Short-term drought outlook • Local forecast • Soil moisture maps • Tropical weather outlook | <ul style="list-style-type: none"> • If middle of the growing season, refer to “Decision-making resources” under the “Growing” column • If end of growing season, refer to “Decision-making resources” under “Overseeding with cool season annuals” column | <ul style="list-style-type: none"> • Long-term drought outlook • ENSO forecast |

Table 2—Cool season perennial forage dominant areas: anticipated drought impacts and considerations during drought planning

| | Growing | Grazing and Harvesting | Post-Grazing and Post-Harvesting | Overseeding with warm season annuals |
|---------------------------------|--|---|--|---|
| Drought impacts | <ul style="list-style-type: none"> • Delayed fertilizer application • Reduced effectiveness of herbicides and insecticides • Delayed results from lime application • Reduced potential for fall stockpile | <ul style="list-style-type: none"> • Delayed/reduced plant growth • Reduced yield • High crop loss • Increased insect damage • Reduced effectiveness or increased injury from herbicides | <ul style="list-style-type: none"> • If middle of the growing season, refer to “Drought impacts” under the “Growing” column • If end of growing season, refer to “Drought impacts” under “Overseeding with warm season annuals” column | <ul style="list-style-type: none"> • Reduced soil moisture • Delayed germination • Stunted growth |
| Crop management actions | <ul style="list-style-type: none"> • Measure forage yield • Scout for weeds and insects • Modify fertilizer applications • Reduce stocking rate • Choose sacrifice lot areas • Develop irrigation strategy (if applicable) | <ul style="list-style-type: none"> • Adjust grazing or harvest timings • Utilize sacrifice lots | <ul style="list-style-type: none"> • Update forage and stored feed inventories • Make storage decisions for stored forages • Inspect stubble height • Test forage quality • Test soils | <ul style="list-style-type: none"> • Irrigation system repair and maintenance • Ordering agrichemicals for next growing season • Soil improvements • Weed control |
| Decision-making resource | <ul style="list-style-type: none"> • Short- and long-term drought outlook • El Nino Southern Oscillation (ENSO) forecast • Local forecast • Soil moisture maps • Extension decision support tools | <ul style="list-style-type: none"> • Short-term drought outlook • Local forecast • Soil moisture maps • Tropical weather outlook | <ul style="list-style-type: none"> • If middle of the growing season, refer to “Decision-making resources” under the “Growing” column • If end of growing season, refer to “Decision-making resources” under “Overseeding with warm season annuals” column | <ul style="list-style-type: none"> • Long-term drought outlook • ENSO forecast |

SECTION 1: BUILDING A RESILIENT OPERATION (PRE-DROUGHT)

scales. These sites include current and historical data and drought impacts by sector (i.e., agriculture, manufacturing, energy).

- To learn more about the U.S. Drought Monitor, USDA programs triggered by the U.S. Drought Monitor data, and how the data can inform decision-making, see the Farmers.gov [Ask the Expert: Understanding the U.S. Drought Monitor; a Q&A with Brian Fuchs](#) (USDA FG 2025a).
- The U.S. Department of Agriculture and partners publish a weekly Weather and Crop Bulletin and U.S. Agriculture in Drought updates that summarize current weather, climate, and agricultural developments across the United States. To view these and other weather- and crop-related updates, see the USDA [Publications website](#) (USDA 2025).
- NWS Drought Information Statements provide updated regional reports on active droughts. To view these reports, see the NOAA NIDIS National Weather Service [Drought Information Statements website](#) (USDC 2025c).
- Receive drought news, forecasts, invitations to timely webinars covering climate outlooks and impacts, and alerts through your email by visiting the Drought.gov [Drought Early Warning System \(DEWS\) Regions Drought Information website](#) (USDC 2025d) and subscribing to one or more of the mailing lists.
- When drought is forecast or under way on your farm, refer to your drought plan for actions that you can take to reduce risk and maintain productivity.

Long-term drought outlook

- Outside of the growing season, producers should view forecasts and long-term outlooks to plan for potential conditions in the coming months. These data will help in making long-term decisions, such as selecting forage varieties and assessing water needs.
- Use the following resources to help monitor long-term climate-related outlooks:
 - The [Climate Prediction Center](#) (CPC) (USDC 2025e) creates 6–10 day, 8–14 day, 3–4 week, 1-month, and 3-month temperature and precipitation outlooks to assist with long-term planning efforts. While day-to-day conditions may differ, these outlooks are the best available forecast for the period of interest.
 - The CPC [Drought Information website](#) (USDC 2025f) includes monthly and seasonal drought outlooks. These maps can show where the CPC thinks drought will develop, persist, remain but improve, or be removed.

Short-term drought outlook

- Drought can stress crops differently depending on the growth stage. Monitoring weather information and having reliable short-term forecasts can help you stay prepared for adverse weather conditions and make quick decisions when needed. Weather and climate data and water and streamflow monitoring tools can help growers know when irrigation may be necessary so that plans can be made, and weekly water demands can be met.

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- National Weather Service Forecasts—[National Weather Service](#) (USDC 2025g) offices produce 7-day forecasts for their coverage area. Each local forecast includes weather conditions, high and low temperatures, wind speed, and relative humidity. It is updated throughout the day. To access your local forecast, enter your ZIP code into the search box or click on the national map. For a more convenient option, use your mobile phone to access the weather.gov website (USDC 2025g).
- Weather Prediction Center Rainfall Forecasts—Outlooks and forecasts produced by the Weather Prediction Center are conveniently located on the Drought.gov [Outlooks & Forecasts website](#) (USDC 2025h). Quantitative precipitation forecasts (QPF) are a daily measure of how much precipitation is predicted to fall over the next week. You will also find cumulative precipitation maps that show the total precipitation expected to fall over a certain number of days. This information is useful for planning various tasks around rainfall events, including establishing new forages, fertilizer or pesticide application, and harvest.
- Tropical Weather Outlook—The National Hurricane Center (NHC) produces an [Atlantic 7-day Graphical Tropical Weather Outlook](#) (USDC 2025i). This map describes the percent chance of tropical cyclone formation in the Atlantic basin for 7 days. In the Southeastern United States, hurricanes and tropical storms occur regularly in the summer and fall. These weather systems are often destructive but can also provide much needed rainfall during dry conditions.

Flash drought

- Flash drought refers to the rapid onset or intensification of drought brought on by below-normal rainfall and increased evaporative demand that leads to reduced soil moisture causing decreased crop yield or crop failure.
- Flash droughts develop quicker (days to weeks) compared to traditional droughts (months to years) and can cause major yield losses if they coincide with sensitive stages like flowering or grain fill and are harder to monitor and plan for using traditional approaches.
- Unlike broader, long-term droughts, flash droughts can develop during seasons with near-normal total precipitation.
- Producers should closely monitor crop conditions during drought, especially during critical growth stages, and plan for greater water and irrigation needs.
- See the NOAA NIDIS [U.S. Drought Portal](#) (USDC 2025b) for news about these and other decision-support products to better inform your drought planning, monitoring, and management activities.

Pasture management

- Drought is typically associated with summer and early fall months, although it can occur at any time throughout the year and vary in duration. Work with your local Extension agent or forage specialist to determine forage varieties best suited to your location.

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- Consider developing an inventory of forage and weed species in areas where your herd grazes. In addition, you may find it useful to take periodic soil samples to monitor soil fertility levels in all grazing areas.
- Develop a comprehensive pasture management plan to help maximize water resources, forage production, and soil health. NRCS and your local Extension agent can assist with developing, adjusting, and implementing this plan.
- For more information about developing a pasture management plan, see:
 - NRCS, [Livestock and Pasture Management website](#) (USDA NRCS 2025a)
 - Alabama Cooperative Extension System, [Pasture and Grazing Management Guide](#) (ACES 2025a)
 - Clemson University Cooperative Extension Service, [Forages website](#) (CUCES 2025a)
 - Louisiana State University AgCenter, [Forage Management Calendar for Louisiana](#) (LSUAC 2025a)
 - Mississippi State University Extension Service, [Pasture Management and Grazing Guide for Livestock Producers](#) (MSUES 2025a)
 - North Carolina Cooperative Extension, [Forages website](#) (NCCE 2025a)
 - University of Arkansas Cooperative Extension Service, [Arkansas Pasture and Forages website](#) (UACES 2025a)
 - University of Florida Institute of Food and Agricultural Sciences (IFAS), [Forage Management Handbook website](#) (UF 2025a)
 - University of Georgia, [Forages website](#) (UG 2025)
 - University of Kentucky Cooperative Extension Service, [Forage Extension Program website](#) (UK 2025a)
 - University of Tennessee, [UT Beef and Forage Center website](#) (UT 2025a)
 - Virginia Cooperative Extension, [Resources for Pasture & Forage — Animal Agriculture website](#) (VCE 2025a)
- Each year, a working group of Extension specialists and researchers publishes an updated Southeast U.S. Vegetable Crop Handbook (SE Vegetable Handbook).
- The handbook is an all-in-one resource for managing your vegetable crop and includes nutrient and pest guidance related to drought.
- To view a copy of the most recent SE Vegetable Handbook, see the University of Tennessee [UT Vegetable Production website](#) (UT 2025b).

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Optimum stocking rate

- Maintain the appropriate stocking rate for your operation to ensure that forage utilization, animal health, and system production are optimized to reduce drought risk.
- Stocking rate refers to the number of animals being grazed within a given system (i.e., usually a single farm) over a defined period. This differs from stocking density, which is the number of animals with access to a particular paddock or field at a particular time. Stocking rate typically refers to an entire farm while stocking density is used to describe a specific pasture or section of a pasture at a specific time. Stocking rate decisions should be made and updated based on forage availability. Stocking rate is calculated using the following equation:

$$\text{Stocking rate} = \frac{\text{Total land area, expressed as acres}}{\text{number of animal unit equivalents}}$$

- Stocking rates calculated using an animal unit equivalent (AUE) are more accurate than using the number of animals since different animals vary in size and weight. One AUE is a mature, non-lactating cow weighing 1,000 pounds and fed at a maintenance level.
- To learn more about using AUE to calculate stocking rates, see the University of Georgia Cooperative Extension [Understanding Stocking Rate in Pasture Systems](#) (UGCE 2025a).

Carrying capacity

- The carrying capacity of the operation is the stocking rate at which animal performance goals are achieved while maintaining the integrity of the forage resource base.
- Overgrazing occurs when the carrying capacity of the forage resource is continuously exceeded and there is an overutilization of the forage as the pasture is continuously grazed too close to the ground. Grazing livestock will stop gaining weight or even begin to lose weight as forage supplies decline and remain below what is required to meet the daily feed requirements of the herd or flock. Overgrazing is common in flash or prolonged drought conditions and increases the potential for soil erosion, weeds, and the need for more supplemental feed or stored forage resources. The seriousness of these consequences depends on the severity, duration, frequency, and timing of the overgrazing event.

Forage availability

- Residual forage is critically important to the forage's resiliency. Residual forage is the stubble that is left behind after a grazing or harvest event. This material is important for regrowth after defoliation. The recommended stubble height is 3 inches for bermudagrass (*Cynodon* spp.), 3 inches for bahiagrass (*Paspalum notatum*), and 4 inches for tall fescue (*Lolium arundinaceum*).
- Forages generally require time between defoliation events to restore root carbohydrate levels that may be depleted as the plant initiates regrowth following the grazing or harvest event. This rest period ensures persistence and the survival of perennial forages.
- The best way to ensure adequate residual forage and rest periods is by implementing rotational grazing.

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- Rotational grazing is the practice of moving a group of livestock between two or more pastures. Continuous grazing is common in perennial grass systems as there is a low labor input and internal fencing is not needed. However, continuous grazing allows the animals to selectively graze the pasture and can lead to areas of overgrazing or undergrazing.
- Rotational grazing is more labor intensive and requires more fencing supplies, but it improves forage persistence and utilization. Under rotational grazing, the forage is allowed rest periods and is grazed more uniformly.
- Monitor forage availability and use this information to guide grazing decisions. The fastest and most cost-effective way to measure forage yield is by using a grazing stick or ruler to measure average forage height. This value can be used to calculate an estimate of forage availability and length of time to graze the pasture.
- Stocking rate decisions should be made based on forage availability. The availability of forage resources will depend on soil type, fertility, and climatic trends. When forage growth is limited during periods of drought, it is important to know when to STOP grazing and when to move animals to a sacrifice area. A sacrifice area is one or more lots or pastures, preferably in need of renovation, where animals may be comfortably contained and supplemented with hay or grains (or both) until the grazing situation improves.

Forage inspection and testing

- Inspect pastures frequently for the presence of overgrazing and growth of toxic plants.
- Test for forage quality or nutritive value.
- During droughts, some grass species such as pearl millet (*Pennisetum glaucum*) and sorghum-sudangrass (*Sorghum bicolor* subsp. *drummondii*) are more prone to accumulate high levels of nitrates. If these species are present in grazing areas, they should be tested for nitrate content by a laboratory. Most grass and broadleaf plant species can accumulate nitrates when under severe plant stress but are less prone to this issue than grasses such as pearl millet and sorghum-sudangrass.
- Evaluate quantity and quality of stored forages.
 - Keep an inventory of your forage resources and stored feed supplies.
 - Walk your pastures often and record the estimated forage yield.
 - Routinely update your inventory of hay, grain, minerals, and any other feeds or supplements for your operation.
 - Keeping track of this data over time will enable you to see trends and changes as they occur.
- It is important to always have at least 1 month of surplus feed available for the current herd or flock size you are supporting on your operation.

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- Determine if additional feeds need to be purchased to meet nutrient demands.
- If supplemental feeds are needed, find out what feed commodities are available locally and reach out to your Extension agent to review your herd or flock's nutrient requirements.
- Livestock managers should test their hay to determine its nutrient content and potential feeding value.
 - Sample each lot of forage separately to ensure accurate results. A “lot” is defined as hay that was managed the same and harvested at the same time, out of the same field, and under the same conditions.
 - To ensure quality, hay should be tested after baling or purchase and again before feeding if the hay was stored outside.
- To learn more about forage testing in your State, see:
 - Alabama Agricultural Experiment Station, [Soil, Forage and Water Testing Laboratory website](#) (AAES 2025)
 - Clemson University Regulatory Services, [Agricultural Services Laboratory website](#) (CU 2025)
 - Kentucky Department of Agriculture, [Forage Testing Program website](#) (KDOA 2025)
 - Louisiana State University AgCenter, [Forage Quality Lab website](#) (LSUAC 2025b)
 - Mississippi State University Extension Service, [Forages website](#) (MSUES 2025b)
 - North Carolina Department of Agriculture & Consumer Services, Farmer Forage Testing website (NCDACS 2025)
 - University of Arkansas Cooperative Extension Service, [Arkansas Pasture and Forages website](#) (UACES 2025a)
 - University of Florida IFAS Extension, [Forage Extension Laboratory website](#) (UF 2025b)
 - University of Georgia Cooperative Extension, [Forages website](#) (UGCE 2025b)
 - University of Tennessee Soil, Plant and Pest Center, [Forage Analysis website](#) (UT 2025c)
 - Virginia Cooperative Extension, [Diagnostic and Laboratory Services website](#) (VCE 2025b)

Soil fertility

- Soil fertility impacts forage yield, persistence, resistance to stress (including drought), and other aspects of your production system. It is important to make all fertilizer decisions following recommendations based on soil tests. Pastures should be sampled at least every 3 years and hayfields need to be sampled annually. Harvesting forages removes significantly more nutrients from the soil than grazing, so these acres must be sampled more frequently. Work with your local Extension agent to collect and submit soil samples for analysis and adjust fertilization accordingly.

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- Soil pH affects many soil properties including nutrient availability, soil structure, soil biological activity, and potential for aluminum toxicity. Many soils in the Southeastern United States are acidic (low pH; below 6.0), but it is possible for soils to be too basic (high pH; above 7.0). Ideally the soil pH should be between 5.8 and 6.5. Work with your local Extension agent to collect and submit soil samples for analysis and adjust soil pH accordingly.

Pests and disease

- Scout often for weeds, insects, or symptoms of diseases and implement integrated pest management (IPM) strategies in consultation with your local Extension office.
- To learn more about managing pests and disease in your forage crop, see:
 - Alabama Cooperative Extension System, [Pasture and Forage IPM Guide](#) (ACES 2025b)
 - Clemson University Cooperative Extension Service, [Integrated Pest Management website](#) (CUES 2025b)
 - Louisiana State University AgCenter, [Insect Pest Management Guides website](#) (LSUAC 2025c)
 - Mississippi State University Extension Service, [Insect Control Guide for Agronomic Crops](#) (MSUCE 2025c)
 - North Carolina Cooperative Extension, [Insect Control on Forage Crops website](#) (NCCE 2025b)
 - University of Arkansas Cooperative Extension Service, [Insect Pest Management website](#) (UACES 2025b)
 - University of Florida IFAS Extension, Integrated Pest Management, [Pasture website](#) (UF 2025c)
 - University of Georgia Cooperative Extension, [Integrated Pest Management website](#) (UGACE 2025c)
 - University of Kentucky Department of Entomology, [Integrated Pest Management Program website](#) (UK 2025b)
 - University of Tennessee Beef & Forage Center, [Forage: Weeds, Disease, and Pest Management website](#) (UT 2025d)
 - Virginia Cooperative Extension, [Field Crops Pest Management Guide](#) (VCE 2025c)

Water management for forages

- It is rare to have irrigation capabilities in a pasture. If irrigation is available, most producers in the Southeast irrigate their hayfields on a set schedule to provide 0.5–1 inch per week. Unfortunately, in a drought year, this level of irrigation may not be sufficient to replace water lost through evapotranspiration. Evapotranspiration occurs when moisture from the ground is transferred to the atmosphere through evaporation from the soil and transpiration through plants.

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- When taking evapotranspiration into account, a good rule of thumb is to increase the irrigation volume to 75 percent of the potential evapotranspiration each week.
- Consult with your local Extension office to obtain potential evapotranspiration data from a reliable source and improve irrigation efficiency.
- Rely on temperature and precipitation forecasts for your area to make informed decisions about managing available moisture for your crop. Refer to the **Resource Links** in appendix 4 for links to relevant Federal and State government offices.

Soil health

- Healthy soils are essential for reducing drought risk and maximizing the productivity and profitability of your land. The NRCS recommends minimizing disturbance and maximizing soil cover, biodiversity, and the presence of living roots as the main principles for achieving healthy soils.
- For a summary of how these principles can help improve soil health over time, see the USDA NRCS [Your Soil Health Journey, What to Look for Along the Way factsheet](#) (USDA NRCS 2022).
- To learn more about soil health and how NRCS can help you achieve healthy soils, see the USDA NRCS [Soil website](#) (USDA NRCS 2025b).

Improving soil health and drought resilience with the USDA Natural Resources Conservation Service (NRCS)

- The Southeastern United States has seen many droughts. The goal of NRCS is to support the resilience of agriculture by addressing priority resource concerns with conservation practices. These voluntary practices help producers reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damage caused by natural disasters, including drought.
- If you irrigate your fields, contact your local NRCS office to develop an irrigation water management plan to optimize water use and reduce irrigation costs.
- Producers interested in applying management actions that mitigate drought risk across their operations may be eligible for financial support through the following NRCS programs:
 - [Environmental Quality Incentives Program](#) (EQIP) (USDA NRCS 2025c)—Year-round NRCS rehabilitation program that can provide financial assistance to conserve groundwater and surface water, reduce soil erosion, and mitigate drought impact.
 - [Conservation Stewardship Program](#) (CSP) (USDA NRCS 2025d)—Year-round NRCS program that provides guidance and financial support to efforts that enhance current conservation plans.
 - [Regional Conservation Partnership Program](#) (USDA NRCS 2025e)—A partner-driven program that leverages partner resources to advance innovative projects which address issues such as drought.

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- NRCS continually evaluates and updates drought-resilient mitigation activities to reflect the latest science and any practice modifications that confer measurable benefit.

Steps to improve drought resilience with NRCS assistance

Step 1: Contact your local NRCS office

- NRCS staff and the landowner can develop management plans that best use resources on the land. For a list of NRCS office locations, see the Farmers.gov [USDA Service Center Locator website](#) (USDA FG 2025b).

Step 2: Develop a conservation plan

- A conservation plan is a written record of your management decisions, and the conservation practices you plan to use and maintain on your land. NRCS encourages landowners to work with conservation planners to voluntarily develop a plan that meets the personal and business objectives and specific needs of the landscape, the producer, or the land manager.
- NRCS conservationists can help farmers and ranchers understand what options exist for their unique water situation, soil type, and production goals. They can also work with you to develop a plan to get through a drought. Through conservation planning, many drought impacts can be reduced with water conservation and soil health practices.
- Talk to your NRCS conservation planner about creating or updating your conservation plan and any available conservation program cost-share opportunities. Plans are voluntary and can be modified as needed. All information provided to NRCS for conservation planning purposes is strictly confidential.

Step 3: Financial and technical assistance

- NRCS professionals can help farmers, ranchers, and forest landowners develop options for their unique water situation, soil type, and production goals. Funding is available to help farmers and ranchers pay for many of these practices through the [Environmental Quality Incentives Program](#) (EQIP) (USDA NRCS 2025c). Reimbursement rates typically cover about half the cost of the adopted practice. Additionally, funds may be available for erosion control through the [Emergency Watershed Protection \(EWP\) Program](#) (USDA NRCS 2025f).

Improving drought resilience and recovery with the USDA Farm Service Agency (FSA)

- The FSA offers programs and services that help farmers grow their operations and recover from disasters.
- Producers are encouraged to register their operation with the FSA and develop a professional relationship with their local FSA office prior to the onset of drought.

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- To find local FSA offices and learn about the programs they offer, see the Farmers.gov [USDA Service Center website](#) (USDA FG 2025b).

Infrastructure

Buildings, facilities, and equipment

- For buildings used for feed and hay storage, make considerations for the type of feedstuff(s) to be housed there and how feedstuff(s) will be unloaded and loaded for feeding.
- In addition to proper storage facilities for feed and hay commodities, consider the equipment needed to properly transport and feed each commodity. Droughts may require more feed than normal, occasionally resulting in additional equipment demands.

Recordkeeping, documentation, and insurance

- The importance of pre- and post-drought documentation cannot be overstated.
- Keep thorough records of conditions such as temperature and rainfall (or lack thereof) and any damage or losses due to drought and extreme heat. These records are essential for insurance compensation and recovery assistance.
- Keep records of harvest, equipment inventories, and purchases of supplies up to date. Long-term records will help to establish a production baseline from which losses can be determined. Be sure that copies of each are in a safe location.
- Review insurance policies for information on which type of weather hazards are covered. At the time of renewal, discuss with your agent to be sure that you have adequate coverage.

Contributing to the Condition Monitoring Observer Reports system

- Contribute to the [Condition Monitoring Observer Reports \(CMOR\) system](#) (UNL 2025) by reporting drought-related conditions and impacts on your farm.
- CMOR is a free online tool provided by the National Drought Mitigation Center (NDMC) in partnership with NOAA NIDIS, and the USDA. It allows producers to submit observation reports on how wet or dry their farm is.
- Many people use CMOR to report drought conditions and impacts, but they are also encouraged to report when conditions are normal or wetter than normal. These reports help inform monitoring entities and are published on a nationwide map where anyone can view the submitted information and attachments.
- CMOR contributors are encouraged to submit frequent (weekly to monthly) reports with photos, even during nondrought conditions. Regular reports help establish a clear baseline of what “normal” conditions look like at a specific location. The baseline makes it easier for drought monitoring entities to identify when conditions deviate from normal and to assess the severity of drought. Photos are especially valuable because they provide visual evidence of localized drought impacts and allow for side-by-side comparisons of wet, dry, and normal conditions over time.

SECTION 2

Adaptive Actions During a Drought

Implement adaptive measures as drought conditions develop and persist. As prolonged periods of reduced precipitation continue, negative impacts on crop yield will begin to occur. Adaptive actions can help to mitigate these negative impacts



A farmer views a prescribed grazing map developed with the USDA Natural Resources Conservation Service as part of their approved conservation plan. (USDA photo)

Personal health and well-being

As you observe and measure the impact of drought on your crops and livelihood, you must also consider its impact on your mind and body. The unpredictable nature of weather can cause stress to your physical, mental, and emotional health. If you notice symptoms or have concerns, seeing a doctor or talking to a counselor is encouraged. Thankfully, Federal and State agencies offer confidential counseling services for farmers. For guidance to help you through this stressful time, see:

- USDA National Institute of Food and Agriculture, [Farm and Ranch Stress Assistance Network](#) (USDA NIFA 2025)
- Alabama Department of Agriculture and Industries, [A Healthy You, A Healthy Farm website](#) (ADAI 2025).

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- Arkansas Department of Agriculture, [Farm Stress and Mental Health website](#) (ADA 2025) and the University of Arkansas Division of Agriculture, [Farm Stress Management and Resilience Project](#) (UADA 2025)
- Clemson University Cooperative Extension Service, [Farm Stress Management website](#) (CUES 2025c)
- Florida Department of Agriculture and Consumer Services, [Farmer Stress Assistance website](#) (FDACS 2025)
- Louisiana Department of Agriculture and Forestry, [Stay Rooted Louisiana website](#) (LDAF 2025)
- Mississippi Department of Agriculture & Commerce, [Agriculture Safety and Mental Health Coalition website](#) (MDAC 2025)
- North Carolina Agromedicine Institute, [NC Farm & Ranch Stress Assistance Network](#) (NCAI 2025)
- University of Georgia Cooperative Extension, [Rural Georgia: Growing Stronger Initiative website](#) (UGCE 2025d)
- University of Kentucky Family and Consumer Sciences Extension, [Farm Stress and Rural Mental Health Resources website](#) (UK 2025c)
- University of Tennessee Family and Consumer Services, [Farm Family Health & Wellness website](#) (UT 2025e)
- Virginia Tech, [Farm Stress and Wellness Resources website](#) (VT 2025)

Review your drought plan

- Review your drought plan and adjust as appropriate.
- For more information on developing your plan, see the **Drought Plan** guidance in appendix 1.

Continue drought monitoring

- Continue monitoring weather conditions and forecasts.
- Be alert to official drought disaster declarations. See “Disaster assistance” at the end of this section and refer to the **Resource Links** in appendix 4 for links to relevant Federal and State government offices.
- See “Drought monitoring” in the **Building a Resilient Operation** section for guidance and links to help determine fertilization, herbicide, irrigation, and harvesting schedules and adapt to drought conditions.

Manage your pasture

- Inspect pastures frequently for the presence of debris, overgrazing, and growth of toxic plants.

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- During droughts, some grass species such as pearl millet (*Pennisetum glaucum*) and sorghum-sudangrass (*Sorghum bicolor* subsp. *drummondii*) are more prone to accumulate high levels of nitrates. If these species are present in grazing areas, they should be tested for nitrate content by a laboratory. Most grass and broadleaf plant species can accumulate nitrates when under severe plant stress but are less prone to this issue than grasses such as pearl millet and sorghum-sudangrass.
- Implement your pasture management plan. During extended periods of drought, adjust the plan as needed to maximize water resources, forage production, and soil health.
- See “Forage inspection and testing” in the **Building a Resilient Operation** section for guidance and links to test your forage and grasses.

Early stages of drought

- If rainfall has failed to keep up with the evaporative demand and the daily evapotranspiration has exceeded precipitation for several days, drought symptoms will become apparent.
- Forage growth will begin to slow, and blades of grass will curl during the mid-day heat. There will be a blue-gray tint to the grass instead of the normal bright green color. Tire tracks may remain apparent in the field 1–2 days after wheel traffic.
- If rainfall is unlikely within the next 3–7 days, the following actions are recommended:
 - Lower your stocking rate by increasing the area being grazed by the current number of animals or reduce the number of animals. For instructions on determining your stocking rate, see “Crop considerations” in the **Building a Resilient Operation** section.
 - Create an inventory of your pasture and stored forage resources. Test your stored forages to know what type of supplement you need for your herd or flock. Make a cull list for your herd or flock.

Advanced drought

- The consequences of dry weather become more evident as drought conditions persist. Although drought alone rarely kills forages, overgrazing the forages during this stressful stage can cause ongoing problems. Overgrazing can lead to weed encroachment and soil erosion, both of which are costly to remediate.
- Forage growth during drought will slow dramatically and forages will begin to go dormant. Overall pasture height will decrease because animals are grazing the forage noticeably faster than the rate at which the forage is growing.
- If rainfall remains unlikely, more drastic actions should be considered to protect the forage stand:
 - Continue to reduce stocking rate to maintain a minimum stubble height of 2 inches for warm-season perennial forages, 3 inches for cool-season perennial forages, and 4–6 inches for annual forages (if regrowth is expected).

SECTION 2: ADAPTIVE ACTIONS DURING A DROUGHT

- Confine livestock to the sacrifice areas to protect most of your forage resources (perennial pastures) during this period. Allow overgrazing in the sacrifice areas but allow only limited access to the rest of your pasture for brief periods. This method will enable you to be strategic with the use of your grazing land and less reliant on stored forage.
- Provide supplementation to keep the diet balanced for your herd or flock. Maintain records on the availability of pasture and stored forage or supplemental feed resources.
- Do not be afraid to cull deeper to maintain the minimum stubble height on your pastures and ensure adequate nutrition for the remaining animals. If no drought relief is in sight, sell low-priority animals before the market price declines sharply. Invest only in animals that are likely to generate a return.
- Monitor pastures for the presence of poisonous plants such as perilla mint (*Perilla frutescens*) and showy croton (*Crotalaria spectabilis*). These plants contain compounds that can be harmful to livestock. Poisoning does not normally occur when an adequate amount of forage is available, but during drought conditions livestock may consume plants they would normally avoid.

Severe drought

- During severe or extreme stages of drought, the forage is now considered to be extremely limited. At this point, the daily evapotranspiration rates have exceeded rainfall for several weeks or months.
- Forage growth has stopped once drought has reached this stage. The pastures have been grazed down to the minimum stubble heights, and the remaining grass is curled and brown and will appear dormant. In extreme stages of drought, grass may enter early dormancy.
- If rainfall is unlikely within the next few weeks or before available feed supplies are exhausted, extreme actions are needed to protect the forage resources on the farm:
 - Continue to use sacrifice areas and graze other pastures sparingly. Refine your culling criteria and narrow your priority list to focus remaining feed resources on the animals that are most likely to be profitable for the farm, through growth or reproduction.
 - Calculate how many animals are feasible to carry based on weather forecasts and feed costs; sell the remaining livestock.

Recordkeeping, documentation, and insurance

- It is important to record observations concerning drought throughout the season to help document impacts and make adjustments for the following season.
- Thorough records of conditions such as temperature and rainfall (or lack thereof), as well as any damage or losses due to drought and extreme heat, are essential for insurance compensation and recovery assistance purposes. Check with your insurance agent or local FSA office regarding how crop loss and damage estimates are calculated.

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- Document the condition of the pastures with frequent height measurements and photos. If forages are damaged or lost, these records will help with the damage assessment and post-drought claims.
- Review and update your inventory system for potential insurance claims and disaster recovery assistance. It is critical to have a documented inventory (photos, videos, and written lists and descriptions) of your farm buildings, vehicles, valuable equipment, and livestock on your farm before a disaster occurs. Maintain accurate records of harvest, equipment inventories, and supplies purchased. Keep copies of this inventory in multiple places such as on your computer, offsite in a safe location, and on a cloud-based server using an established procedure to update and transmit the information weekly.
- Contact your insurance agent as soon as a problem is noticed to begin the insurance claim process (Federal, private, or both). This can facilitate filing claims during significant drought events. Accurate losses of crops may not be fully documented yet but start the paperwork immediately because insurance claims can take months to resolve following drought.

Contributing to the CMOR system

- Continue reporting your conditions in the CMOR system.
- See “Contributing to the Condition Monitoring Observer Reports system” in the **Building a Resilient Operation** section for guidance and resources to help you report your drought condition.

Disaster assistance

- The availability of many disaster assistance programs is based on the intensity and impact of drought as designated by the [U.S. Drought Monitor](#) (NDMC, USDC, USDA 2025). Drought monitor maps are released each Thursday at 8:30 a.m. eastern time.
- Communicate early and often with your emergency assistance contacts. Note that assistance will vary from one drought to the next and one budget year to the next.
- Call your local USDA FSA Office to report any losses or damages, and inquire about available assistance programs, application procedures, and deadlines. To find local FSA offices, see the Farmers.gov [USDA Service Center website](#) (USDA FG 2025b).
- To learn more about USDA Disaster Assistance programs that may help you during a drought, see:
 - [Noninsured Crop Disaster Assistance Program](#) (NAP) (USDA FSA 2025a)—FSA program that provides assistance for eligible farmers who suffer losses or are prevented from planting agricultural commodities that are not eligible for protection by Federal crop insurance.
 - [Livestock Forage Disaster Program](#) (LFP) (USDA FSA 2025b)—FSA program that offers financial support to eligible livestock producers who experience grazing losses due to qualifying drought conditions on Federally managed rangelands.
 - [Emergency Conservation Program](#) (ECP) (USDA FSA 2025c)—FSA program with technical assistance through NRCS that helps eligible farmers and ranchers repair damage to farmlands caused by natural disasters and implement emergency water conservation measures in periods of severe drought.

SECTION 3

Drought Recovery (Post-Drought)

Once a disaster designation is declared or drought conditions are no longer negatively impacting your crop (the drought is over), take the following actions to begin the recovery process



Large circular hay bales lay upright in a field after being harvested.
(USDA photo)

Personal health and well-being

Completely losing or partially losing a crop to drought is stressful. It is crucial to take care of yourself and maintain your physical, mental, and emotional well-being. See “Personal health and well-being” in the **Adaptive Actions During a Drought** section for Federal and State resources to help you through this stressful time.

Communications

- Consistent communication with your local Extension agent offers outside professional input into crop management strategies.
 - Contact your Extension agent to review management protocols and production data from the drought period.
 - Use your Extension agent’s input to adjust management practices and other protocols for future drought.
- Early and constant communication (including post-drought) with your crop insurance provider and adjuster, local USDA [Farm Service Agency \(FSA\) Office](#) (USDA FG 2025b), and Risk Management Agency (RMA) can help to increase the efficiency of processing insurance and disaster assistance claims.
- See **Resource Links** in appendix 4 to find local Extension offices and other State and Federal resources that you may consult for further guidance.

Recordkeeping, documentation, and insurance

Recordkeeping

- Continue to document environmental conditions such as temperature and rainfall (or lack thereof).
- Continue to document the condition of the pastures with frequent height measurements. These records will help with the damage assessment and post-drought claims if forages were damaged or lost.
- Keep notes throughout the recovery period for future use and considerations regarding any alteration to management practices. Describe the work you did and record all expenses. This includes keeping a log of contacts regarding conversations with insurance, State, and Federal agency personnel to create a record of your recovery efforts that can be used later as documentation for disaster assistance programs.
- It is recommended to have a second person involved in the conversations so that one can ask questions and the other can take notes. This will provide a second viewpoint of the discussion and reduce inaccuracies.

Documenting damage

Photo and video documentation

- The phrase that a “picture is worth a thousand words” holds especially true when documenting drought losses.
- Take photos or videos of damaged pastures and hayfields before beginning any grazing. Make notes describing what is in the pictures and where they were taken. Having a date and time stamp will be helpful. This “after” documentation will be used with your pre-drought “before” documentation to clearly show your losses.

Estimating losses

- Be diligent in keeping detailed records each year, regardless of drought conditions. Records from non-stressed years can be compared to current yields to estimate loss due to drought.
- Document all losses with photos, receipts, data, and rainfall records.
- Check with your insurance agent or local FSA office regarding how crop loss and damage estimates are calculated and adjust your recordkeeping practices accordingly.

Insurance claims process

- Continue the insurance claims process (Federal, private, or both).
- Some policies do NOT allow harvesting to be conducted when making a claim. Ensure you know all procedures and rules and contact your agent when you first observe a problem.

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Contributing to the CMOR system

- Continue reporting your conditions in the CMOR system even though the drought has ended.
- See “Contributing to the Condition Monitoring Observer Reports system” in the **Building a Resilient Operation** section for guidance and resources to help report your drought condition.

Disaster assistance

- The availability of many disaster assistance programs is based on the intensity and impact of drought as designated by the [U.S. Drought Monitor](#) (NDMC, USDC, USDA 2025). Drought monitor maps are released each Thursday at 8:30 a.m. eastern time.
- Communicate early and often with disaster assistance contacts. Check in with them throughout the recovery process. Note that assistance will vary from one drought to the next and one budget year to the next.
- Call your local USDA FSA office to report any losses or damage and inquire about available assistance programs, application procedures, and deadlines. To find local FSA offices, see the Farmers.gov, [USDA Service Center website](#) (USDA FG 2025b).
- Check with your local Extension office, USDA agencies, and the State Department of Agriculture to see what assistance may be available after the drought.
- Consult the following resources:
 - FEMA, [Disaster Recovery Center Locator](#) (USDHS FEMA 2025a) and [Individual Assistance website](#) (USDHS FEMA 2025b) to find the closest recovery center and other resources to assist you during your recovery
 - USDA, [Disaster Resource Center website](#) (USDA DRC 2025) for updates on emergency designation areas and available assistance programs
 - Farmers.gov, [Protection and Recovery website](#), including the [five-step Disaster Assistance Discovery Tool](#), to learn which USDA disaster assistance programs are available to assist you with your recovery (USDA FG 2025c)
 - U.S. Department of Labor, [Disaster Unemployment Assistance Program website](#) (USDOL ETA 2025)
- To learn more about USDA Disaster Assistance Programs that may be right for you, see:
 - [Emergency Loan Program](#) (USDA FSA 2025d)—FSA program that provides eligible farmers and ranchers low-interest loans to help them recover from production and physical losses
 - [Disaster Set-Aside Program](#) (USDA FSA 2025e)—FSA program that allows eligible FSA borrowers to skip an annual installment payment and move it to the end of the loan repayment period

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- [Noninsured Crop Disaster Assistance Program \(NAP\)](#) (USDA FSA 2025a)—FSA program that provides assistance for eligible farmers who suffer losses or are prevented from planting agricultural commodities that are not eligible for protection by Federal crop insurance
- [Livestock Forage Disaster Program \(LFP\)](#) (USDA FSA 2025b)—FSA program that offers financial support to eligible livestock producers who experience grazing losses due to qualifying drought conditions on Federally managed rangelands
- [Emergency Conservation Program \(ECP\)](#) (USDA FSA 2025c)—FSA program with technical assistance through NRCS that helps eligible farmers and ranchers repair damage to farmlands caused by natural disasters, including severe drought

Steps for developing a forage recovery plan

- Once significant rainfall has been received and the drought has ended, work with your local Extension agent to develop a forage recovery plan. Please note that it may take several rainfall events to relieve drought conditions, depending on the length and severity of the drought.
- If you have not already done so, test your soils and apply appropriate fertilizers based on soil testing results. The application of fertilizer may need to be delayed or adjusted if the forage has entered dormancy or it is the wrong season for the forage to grow.
- Identify weed species and develop an integrated weed management plan. Your plan may include mowing or grazing, strategic forage management, or chemical control. Appropriate options will depend on the time of year and severity of infestation.
- Plant annual forages or replant perennial pastures depending on the time of year. The recommended planting date will depend on the chosen forage species and the location of your farm. Consider planting an annual forage to prevent soil erosion and promote soil water retention, especially if it is not the ideal time to plant the desired perennial forage.
- Slowly increase the stocking rate on your farm to rebuild the herd or flock. Forage growth will be slow after such a plant stress event. Do not put more animals on the pasture than what it can support (see “Carrying capacity” in the **Building a Resilient Operation** section). Continual overgrazing is detrimental to forage growth and persistence.

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APPENDIX 1

Drought Plan

Drought preparedness is essential for improving operational efficiency, profitability, and sustainability. A critical step in drought preparedness is developing a drought plan. A Drought Plan, customized for your location, should outline available resources, key responsibilities and tasks for each person, and decision-making tools based on drought severity and duration. Although drought is often thought of as a slow progression, during high temperatures the effects of drought may be seen within a few days to a week (i.e., flash drought). Having a plan to help prioritize and guide you through management decisions can improve efficiency and enhance sustainability.

The following template should be tailored to your operation. Work with your local Extension agent and NRCS office to develop this into a useful, working document. Some overlap will be seen with tasks listed in the **Building a Resilient Operation** section. This plan should guide you through tasks and decisions as drought conditions begin and worsen. Additional information may also be found in the **Initial Site Planning** guidance in appendix 3.

Basic information

Your drought plan should include basic information about your operation: name, date, location, contact information, the total number of acres, quantity of grazing acres, and herd or flock size. Attach aerial photograph(s) of your property and include information about each management area (e.g., acres of annual forage, acres of perennial forage, sacrifice grazing area, grazing areas divided by fencing, water sources, and buildings for storing forage).

Pre-drought operation and inventory

Tracking weather conditions

Routinely observe and record onsite or nearby measurements of temperature and precipitation (or lack thereof). Use these measurements to monitor drought and make livestock management decisions. Your drought plan should include a list of nearby weather data sources. Refer to the **Resource Links** in appendix 4 for reliable data sources in your State.

Consider becoming a [Community Collaborative Rain, Hail & Snow Network](#) (CoCoRaHS) precipitation observer. Through CoCoRaHS, you can monitor and report precipitation on your farm and help improve precipitation data quality and forecasting.

Pasture management

The following information should be documented for each pasture to assist in proper forage management and sound record keeping:

- Total number of grazable acres and pastures
- Number and size of any grazable sections divided by temporary fencing

APPENDIX 1: DROUGHT PLAN

- Forage species available or planted during each season
- An evaluation of quantity and quality of stored forages
- Weed species present in pastures
- Water source location(s)
- Water trough size or estimated amount of natural water available
- Number of animals typically stocked at that location when grazing is ideal
- Whether the location contains feed troughs, hay rings, and other equipment needed to supplement with feed or hay when necessary
- Irrigation resources including pivots or laterals, hoses, reels, and pumps.

Equipment and infrastructure

Include an outline of available and needed equipment and people, and where equipment will be moved or sourced. As a starting point, ensure that tractors are in good working order to transport stored forages and supplemental feeds. Depending on the source, this may also require loaders (front or rear, or both), hay hauling wagons, and feed mixing and delivery systems. Additionally, it is important to maintain irrigation equipment including pivots or laterals, hoses, reels, and pumps. Additional people may also need to perform temporary tasks such as helping with transportation, operating farm equipment, and scouting grazing areas for poisonous weeds.

Key contacts

Complete the Contacts List in appendix 2 by adding the names and phone numbers of emergency personnel, insurance agents, contractors, suppliers, and Federal, State, and local agencies. Keep a copy of this list with your drought plan so that your important information is together in one place and readily available.

Important considerations during the drought

Your drought plan should address the following concerns as drought develops and worsens:

Grazing area considerations

- What strategy will you use to reduce grazing pressure in your pastures (e.g., limit the number of animals grazing, limit the time of grazing, supplement with additional forage or feed)?
- How will you monitor pastures for the presence of toxic weeds (e.g., perilla mint [*Perilla frutescens*], Johnsongrass [*Sorghum halepense*])?
- What steps will you take to help your pastures recover once drought conditions have ended?

APPENDIX 1: DROUGHT PLAN

Animal health considerations

- Will you adjust how you monitor livestock health during drought?
- Do you have a plan to work closely with your veterinarian to monitor the overall health of the herd or flock? Both environmental (heat) and nutritional stress can compromise pregnancy and cause internal problems that may not be immediately evident.
- How will you determine if additional feed or hay will need to be purchased to meet nutrient demands?
- For animals with lower body condition scores, consider adjusting your culling criteria to help protect forage resources.
- Do you have a plan to test stored forage and feed for potential toxicity concerns?

Drought impacts

- Bookmark and view the weekly [U.S. Drought Monitor](#) to remain current on drought conditions and designations in and around your county.
- Document yield losses of grazing pastures and hay fields.
- Document all losses with photos, receipts, data, and rainfall records.

Insurance and disaster assistance help

- Begin the insurance claims process (Federal, private, or both). Contact your agent to facilitate filing claims.
- Stay in touch with Federal and State agencies to learn about disaster assistance that may be available to you.

Other drought plan considerations

- Re-evaluate all procedures and protocols used before, during, and after the drought. Note what did and did not work; then adjust plans as needed for future use.
- Examine and update all inventory lists (e.g., vehicles, equipment, supplies) and develop a list of anything that should be purchased or sold in preparation for future droughts.

APPENDIX 1: DROUGHT PLAN

Drought Plan Template

Basic information

Name _____ Date _____

Location _____ Contact info _____

Crop(s) grown _____ Irrigated acres _____

Estimated harvest date _____

Operations & inventory

List weather data sources

List nearby water sources and irrigation system details

List equipment and labor needs

List contact information for key personnel, suppliers, and agencies

Crop concerns and drought response

Soil and crop considerations

Water considerations

Yield impact and harvesting considerations

Insurance and disaster assistance help

APPENDIX 2

Contacts List

You may customize this for your operation. Delete items that do not pertain to your commodity or location and add companies or organizations specific to your commodity.

Individuals

| Name(s) | Role(s) | Phone number(s) | Notes |
|---------|--------------------------------------|-----------------|-------|
| | Owner(s) | | |
| | Members of the Drought Response team | | |
| | Other key employees or managers | | |
| | | | |
| | | | |
| | | | |

Emergency Services

| Organization | Name(s) | Phone number(s) | Notes |
|------------------------------|---------|-----------------|-------|
| Emergency Management agency | | | |
| Emergency medical responders | | | |
| Fire Department | | | |
| Hospitals | | | |
| Law Enforcement | | | |
| | | | |
| | | | |

Insurance Companies

| Organization | Name(s) | Phone number(s) | Notes |
|-------------------------------|---------|-----------------|-------|
| Commodity insurance companies | | | |
| | | | |
| | | | |
| | | | |
| | | | |

APPENDIX 2: CONTACTS LIST

Contractors and Suppliers

| Organization | Name(s) | Phone number(s) | Notes |
|--|---------|-----------------|-------|
| Electrical contractor | | | |
| Equipment dealer | | | |
| Equipment rental company (lifts, generators, etc.) | | | |
| Fuel supplier | | | |
| Generator servicing | | | |
| Mechanic | | | |
| Plumbing contractor | | | |

Federal, State, and County Organizations

| Organization | Name(s) | Phone number(s) | Notes |
|---|---------|-----------------|-------|
| County Emergency Management Agency | | | |
| County Health Department | | | |
| Local Extension Office | | | |
| State Board of Animal Health | | | |
| State Department of Agriculture | | | |
| USDA Farm Service Agency (FSA) | | | |
| USDA Natural Resources Conservation Service (NRCS) | | | |
| U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA) | | | |
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APPENDIX 3

Initial Site Planning

Considerations when deciding on a new location to establish or purchase farmland

Drought risk

Droughts are inevitable in the Southeastern United States. Although drought severity and duration are difficult to predict, livestock producers can still develop management plans specific to individual locations. If you are thinking of purchasing or leasing additional pastureland, there are some site characteristics to consider that will help you be better prepared to adapt to drought conditions in the future.

Site characteristics

Water sources

- Choose land with adequate surface water or groundwater sources. Having access to a pond or stream could be invaluable during drought conditions.
- Consider limitations on the use of both groundwater and surface water supplies. Some areas require permitting.
- Consider the quality of surface water and groundwater sources. Be aware of potential issues with water sources (e.g., salinity, hardness, pH).

Grazing areas

- Choose land with an adequate number of grazable acres. Consider how the grazing areas are divided by fencing.
- Consider forage species that are already available at this location.
- Estimate how many animals may be stocked at this location when grazing is ideal.
- Are feed troughs, hay rings, and other supplemental feed equipment already present?

Utilities, buildings, and roads

- Make sure your site has reliable access to the electrical grid and water supply.
- Topography and flood maps should be consulted when building new facilities for storing feed and hay. Buildings should be built on well-drained soil and on land that is level or sloped away from streams and other bodies of water.
- Locate buildings above the 100-year flood zone whenever possible, and construct buildings and other structures to meet the building code requirements in your area.

APPENDIX 3: INITIAL SITE PLANNING

- Choose a site with good roads that will accommodate the movement of livestock, water, feed, and hay.

Other factors

- Consider the history of the land and how it was previously used. If you are concerned about any areas of potential contamination, an environmental site assessment may be necessary.
- If possible, try to learn whether the property lies in the path of any future plans for road construction or building projects that could impact your operation.

APPENDIX 4

Resource Links

Extension, State, and Federal websites

Alabama

| Extension websites * | Purpose |
|--|---|
| Forages | Resources to help producers improve forage management and productivity |
| Extension Office Locator | Contact information for Extension agents in your county |
| * Alabama Cooperative Extension System | |
| State websites | Purpose |
| Alabama Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| Alabama Department of Agriculture and Industries | Main source for answers to your agriculture-related questions |
| Alabama Office of the State Climatologist | Primary source of weather and climate information in the State |
| Auburn University Water Resources Center and Alabama Agricultural Experiment Station Alabama Drought Reach | Provides drought communication and agricultural impact monitoring in the State; includes weekly drought summaries |

Arkansas

| Extension websites * | Purpose |
|--|--|
| Forages | Resources to help producers improve forage management and productivity |
| Extension Office Locator | Contact information for Extension agents in your county |
| * University of Arkansas Cooperative Extension Service | |
| State websites | Purpose |
| Arkansas Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| Arkansas Department of Agriculture | Main source for answers to your agriculture-related questions |

Florida

| Extension websites * | Purpose |
|--|--|
| Forages | Resources to help producers improve forage management and productivity |
| Extension Office Locator | Contact information for Extension agents in your county |
| * University of Florida IFAS Extension | |

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APPENDIX 4: RESOURCE LINKS

| State websites | Purpose |
|---|--|
| Florida Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| Florida Department of Agriculture and Consumer Services (FDACS) | Main source for answers to your agriculture-related questions |
| FDACS Division of Animal Industry | Main source for answers to your animal industry-related questions |
| Florida Climate Center | Primary source of weather and climate information in the State |

Georgia

| Extension and university websites | Purpose |
|---|--|
| Forages * | Resources to help producers improve forage management and productivity |
| Extension Office Locator ** | Contact information for Extension agents in your county |
| Weather Network *** | Reports on current weather conditions from an automated network of stations, as well as historical data and applications |

* University of Georgia College of Agricultural and Environmental Sciences

** University of Georgia Cooperative Extension

*** University of Georgia

| State websites | Purpose |
|---|--|
| Georgia Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| Georgia Department of Agriculture (GDA) | Main source for answers to your agriculture-related questions |
| GDA Animals | Main source for answers to your animal industry-related questions |
| Georgia Office of the State Climatologist | Primary source of weather and climate information in the State |

Kentucky

| Extension websites * | Purpose |
|--|--|
| Forages | Resources to help producers improve forage management and productivity |
| Extension Office Locator | Contact information for Extension agents in your county |
| Drought Resources | Information and resources meant to assist in dealing with drought |

* University of Kentucky Cooperative Extension Service

| State websites | Purpose |
|--|--|
| Kentucky Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| Kentucky Department of Agriculture | Main source for answers to your agriculture-related questions |
| Kentucky Climate Center | Primary source of weather and climate information in the State |

APPENDIX 4: RESOURCE LINKS

Louisiana

| Extension websites * | Purpose |
|--|---|
| Pasture and Forage Crops | Resources to help producers improve forage management and productivity |
| Extension Office Locator | Contact information for Extension agents in your county |
| * Louisiana State University AgCenter | |
| State websites | Purpose |
| Louisiana Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| Louisiana Department of Agriculture and Forestry | Main source for answers to your agriculture-related questions |
| Louisiana Office of State Climatology | Primary source of weather and climate information in the State |
| Louisiana State University AgCenter Louisiana Agrilimatic Information System | A network of automated weather stations that collect and share climatic data relevant to agricultural production in the State |

Mississippi

| Extension websites * | Purpose |
|--|--|
| Forages | Resources to help producers improve forage management and productivity |
| Extension Office Locator | Contact information for Extension agents in your county |
| * Mississippi State University Extension Service | |
| State websites | Purpose |
| Mississippi Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| Mississippi Department of Agriculture and Commerce | Main source for answers to your agriculture-related questions |
| Mississippi Office of the State Climatologist | Primary source of weather and climate information in the State |

North Carolina

| Extension websites * | Purpose |
|--|--|
| Forages | Resources to help producers improve forage management and productivity |
| Extension Office Locator | Contact information for Extension agents in your county |
| * North Carolina Cooperative Extension | |
| State websites | Purpose |
| North Carolina Governor's Office | News and information from the Governor, including evacuation orders, safety orders, and emergency declarations |
| North Carolina Department of Agriculture and Consumer Services | Main source for answers to your agriculture-related questions |
| North Carolina State Climate Office | Primary source of weather and climate information in the State |
| North Carolina Drought Management Advisory Council | State-level drought monitoring, including weekly infographic updates |

APPENDIX 4: RESOURCE LINKS

South Carolina

| Extension websites * | Purpose |
|--|--|
| Livestock and Forages | Resources to help producers improve forage management and productivity |
| Extension Office Locator | Contact information for Extension agents in your county |

* Clemson University Cooperative Extension Service

| State websites | Purpose |
|--|--|
| South Carolina Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| South Carolina Department of Agriculture | Main source for answers to your agriculture-related questions |
| South Carolina State Climatology Office | Primary source of weather and climate information in the State |
| South Carolina Drought.com | Current drought status and state-level information and resources to assist in dealing with drought |

Tennessee

| Extension websites * | Purpose |
|--|--|
| Livestock and Forage Systems | Resources to help producers improve forage management and productivity |
| Extension Office Locator | Contact information for Extension agents in your county |

* University of Tennessee Extension

| State websites | Purpose |
|---|---|
| Tennessee Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| Tennessee Department of Agriculture | Main source for answers to your agriculture-related questions |
| Tennessee Climate Office | A primary source of weather and climate information in the State; it also produces Weekly Drought Summaries |

Virginia

| Extension websites * | Purpose |
|--|---|
| Resources for Pasture & Forage | Statewide Extension resources |
| Extension Office Locator | Contact information for Extension agents in your county |

* Virginia Cooperative Extension

| State websites | Purpose |
|--|--|
| Virginia Governor's Office | News and information from the Governor, including evacuation orders and emergency declarations |
| Virginia Department of Agriculture and Consumer Services | Main source for answers to your agriculture-related questions |
| Virginia Department of Environmental Quality Drought | Important site that monitors hydrologic conditions in the State and issues drought guidance and declarations |

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State (FSA and NRCS)

| State FSA websites | Purpose | State NRCS websites | Purpose |
|---|---|--|--|
| USDA FSA Alabama | | USDA NRCS Alabama | |
| USDA FSA Arkansas | | USDA NRCS Arkansas | |
| USDA FSA Florida | | USDA NRCS Florida | |
| USDA FSA Georgia | | USDA NRCS Georgia | |
| USDA FSA Kentucky | Focus on State FSA resources, including financial and technical information sharing | USDA NRCS Kentucky | Focus on State NRCS resources, including financial and technical information sharing |
| USDA FSA Louisiana | | USDA NRCS Louisiana | |
| USDA FSA Mississippi | | USDA NRCS Mississippi | |
| USDA FSA North Carolina | | USDA NRCS North Carolina | |
| USDA FSA South Carolina | | USDA NRCS South Carolina | |
| USDA FSA Tennessee | | USDA NRCS Tennessee | |
| USDA FSA Virginia | | USDA NRCS Virginia | |

Federal

| Federal websites | Purpose |
|---|--|
| Regional Climate Centers: Midwestern (KY), Southeastern (AL, FL, GA, NC, SC, VA), Southern (AR, LA, MS, TN, TX) | The regional climate centers house climate maps, drought maps, precipitation summaries, and other climate monitoring information |
| U.S. Department of Agriculture (USDA) | News and announcements related to agricultural commodities and disaster recovery programs |
| USDA Disaster Resource Center | Resources to help you build long-term resilience to and recover from droughts and other disasters |
| USDA Farm Service Agency (FSA) | Assistance with securing loans, receiving payments, and applying for disaster relief programs |
| USDA Natural Resources Conservation Service (NRCS) | Financial and technical assistance for farmers, ranchers, and forest landowners |
| USDA Office Locator | Contact information for USDA offices in your county, including FSA, NRCS, Rural Development, and Conservation Districts |
| USDA Publications | Publications that summarize current weather, climate, and agricultural developments across the United States |
| USDA Risk Management Agency (RMA) | Assistance with Federal crop insurance and management risk |
| USDA RMA Agent Locator | Contact information for local RMA offices in your county |
| U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA) | Resources to view historical, current, and predicted drought activity and warnings in your area |
| NOAA Climate.gov ENSO Blog | Contains detailed scientific information like sea surface temperature anomalies, expert discussions, and diagnostic tools |
| NOAA National Integrated Drought Information System (NIDIS) Drought.gov | A multi-agency resource that coordinates drought monitoring, forecasting, planning, and information at national, Tribal, State, and local levels |

**FORAGE: A PRODUCERS GUIDE TO DROUGHT
PREPARATION, MANAGEMENT, AND RECOVERY IN THE
SOUTHEASTERN UNITED STATES**

APPENDIX 4: RESOURCE LINKS

| Federal websites | Purpose |
|--|---|
| NOAA NIDIS Drought.gov Evaporative Stress Index (ESI) | The index is a good tool for assessing surface soil moisture and crop stress conditions. It is also useful for capturing early signals of flash drought |
| NOAA NIDIS Drought.gov Mississippi River Basin Drought & Water Dashboard | Timely information on past, present, and future drought conditions in the Mississippi River Basin |
| NOAA NIDIS Drought.gov Southeast Drought Early Warning System (DEWS) | An interagency effort to improve drought early warning capacity and build long-term drought resilience throughout the region |
| NOAA High Plains Regional Climate Center Applied Climate Information System Climate Maps | Maps showing a variety of past conditions, including precipitation, temperature, and departures from the long-term average |
| NOAA National Weather Service (NWS) | Current conditions, hourly forecasts, and daily forecasts for your area |
| NWS Drought Information Statements | Provides updated reports on recent weather and hydrologic conditions, drought impacts, and drought outlooks |
| NWS Climate Prediction Center Drought Information | Provides monitoring tools and outlooks based on timeframe and location |
| NWS National Hurricane Center (NHC) Atlantic 7-day Graphical Tropical Weather Outlook | Describes the percent chance of tropical cyclone formation in the Atlantic basin during the next 7 days |
| NWS Weather.gov National Forecast Maps | Hourly and daily forecast maps of weather-related variables, including precipitation, temperature, and cloud cover |
| U.S. Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) | News and information to help you prepare for and recover from droughts and other disasters |
| U.S. DHS Ready.gov Drought | Resources to help individuals prepare for and recover from droughts |
| U.S. Department of the Interior Geological Survey (USGS) National Water Dashboard | Real-time water and streamflow data collected at USGS observation stations throughout the United States, with additional data layers that include recent and forecast precipitation, temperature, and drought |
| U.S. Drought Monitor (USDM) | Shows drought location and intensity across the United States and its territories. The map is released every Thursday |

Baxter, L.L. 2026. Forage: a producers guide to drought preparation, management, and recovery in the Southeastern United States. Gen. Tech. Rep. SRS-282. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 42 p. <https://doi.org/10.2737/SRS-GTR-282>. Gavazzi, Michael; McNulty, Steven; Britton, Stephen, eds.

Drought is a natural part of the Southeastern United States climate and a threat to agricultural productivity and profitability. Whether slow developing or rapid onset, drought can have severe impacts on agricultural crops and livestock depending on its timing, severity, and length. Drought is expected to become increasingly common in the Southeast due to increasing temperatures, longer dry periods between rain events, and growing water demand across the region. To help producers remain resilient and productive in the face of this threat, the U.S. Department of Agriculture Southeast Climate Hub co-produced this guide with university Extension to help forage producers prepare for, manage, document, and recover from droughts.

KEYWORDS: farm planning, resilient agriculture, disaster recovery, adaptation, farm, crop, weather.



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