

# DROUGHT INTRODUCTION

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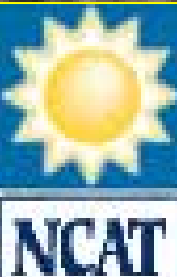


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# What is Drought?

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- **Drought defined by climate**
  - A period of prolonged below-normal precipitation
- **Drought as a production barrier**
  - Precipitation is insufficient for crop or forage growth



# Moisture Imbalance and Drought

- **Drought is when crops need more water than is available**

- Precipitation is too low at critical times
- Precipitation or snow pack is not sufficient to restore ground water recharge
- Soil does not absorb precipitation effectively
- Moisture evaporates too easily from soil
- Recharge of aquifers, lakes, and reservoirs is insufficient to provide irrigation water



# Eastern Droughts

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- **Rainfall is usually sufficient – droughts are short-lived**
  - Seasonal water shortages
  - Primary impact is on local soil moisture
  - Minimal impact on regional water recharge
- **Good management practices can reduce drought impacts**
  - Enhance water absorption and retention
  - Balance water availability with water use

# Western Droughts

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- **Arid conditions make agriculture dependent on irrigation**
  - Drought reduces water recharge
  - Reduced recharge limits water availability for irrigation and livestock needs
- **Dryland production limits management options**
  - Normal low rainfall and snow pack limit soil moisture reserves
  - Some conservation practices deplete soil moisture

# Drought Responses

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- **Manage in good years for drought potential**
  - Use good farm management practices
  - Diversify crop and livestock production practices
- **Manage during drought to lessen its impact**
  - Reduce herd size
  - Decrease cropping intensity
- **Manage financial impacts with drought aid and insurance**

# Drought Management

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- **Prepare your farm to tolerate drought**



- Understand the production capabilities of your land
- Choose crops, forages, and livestock adapted to your soil conditions and climate
- Manage crops and livestock to enhance water use efficiency and water retention

- **Monitor weather information to prepare for droughts**

# Land Capability: Crops and Forages

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- **Select production practices appropriate for the nature and condition of your land**
  - Know your farm's normal precipitation
  - Regularly test the moisture content and fertility level of your soil
  - Understand the nutrient and water needs of the plants you grow





# Land Capability: Livestock and Forages

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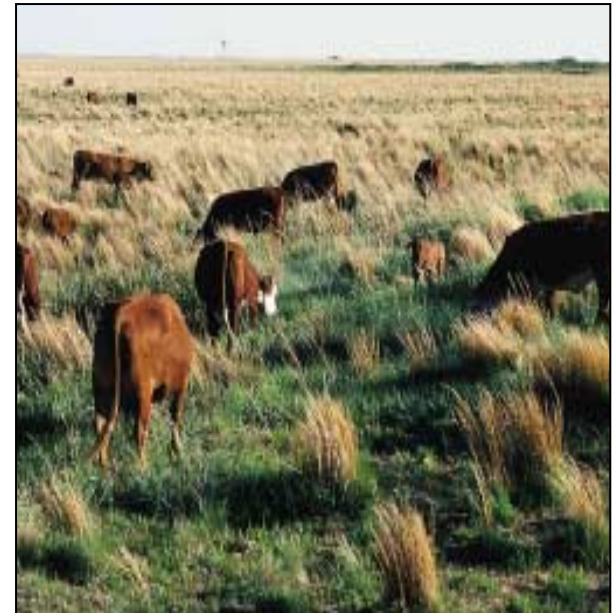
- **Select and manage livestock and forages based on the nature and condition of your land**
  - Choose species and breeds adapted to your farm's environment
  - Select forages and cover crops best suited for your climate
  - Use management practices that protect soil quality and enhance water conservation



# Balance Water Needs and Availability

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- **Manage soil to enhance its ability to capture and retain water**
- **Diversify crops to include drought-tolerant species**
- **Include a combination of crop and livestock enterprises for greater management flexibility**



# Water Capture and Retention

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- **Use conservation practices that increase water infiltration and minimize water loss**
  - Protect the soil surface with plants, cover crops, mulches, and residues
  - Use buffers to capture snowmelt, reduce runoff, and prevent erosion
  - Use manure, cover crops, and crop residues to increase soil organic matter and build soil quality



# Diversity Decreases Risk

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- **Crop Diversity**

- Including drought-tolerant species ensures yields, even in dry years
- Using a combination of species in the field or within rotations enhances pest control and water and nutrient use



- **Livestock Diversity**

- Mixed herds use forages more effectively
- Different species control different types of toxic plants

# Drought -Tolerant Plants

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- **Short season crops or varieties**

- Planting can be timed to avoid seasonal dry periods
- Example: yellow clover

- **Deep rooted crops**

- Roots have access to subsurface moisture
- Example: alfalfa

- **Grasses and succulent plants**

- Plants use water efficiently during growth
- Examples: fescue, sorghum, crested wheat



# Multi-Species Grazing

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- **You can more effectively balance animal numbers with available forage**
  - Combination of large and small ruminants permits more precise adjustments of animal numbers
  - Some species forage farther from water than others
- **Animals use forages more effectively**
  - Different livestock species favor different forages
  - Different species have different grazing methods and habits



# Balanced Crop-Livestock Enterprises

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- **Cycle nutrients between crops and livestock**
- **Improve soil quality**
  - Manure is recycled to fertilize crop fields
  - Soil tilth improves when crops are rotated with forage production
- **Provide production options in dry years**
  - Limit production of water-demanding crops and produce livestock and drought-tolerant plants
  - Graze drought-stricken crops to salvage their value



# Dryland Agriculture in Arid Lands

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- **Know your local environment**
  - Soil water-absorbing and water-holding capabilities
  - Precipitation patterns and amounts
- **Balance water resources with ag production**
  - Choose crops and livestock adapted to local moisture conditions
  - Use land management practices that protect and conserve water resources



# Sustainable Irrigation

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- **Grow drought-resistant plants**
- **Apply water efficiently**
- **Manage soil and water to minimize water loss**
- **Conserve water for critical growth periods**
- **Use irrigation practices that enhance root growth**
- **Minimize downstream environmental damage caused by irrigation runoff and deep percolation**



# Irrigation Concerns

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- **Environmental concerns**

- Quality and quantity of irrigation water
- Ground and surface water degradation and depletion

- **Water use conflicts**

- Between neighboring farmers
- Between states
- Between urban and rural areas



# Drought Economics

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- **Minimize economic losses caused by drought**
  - Use agricultural management practices appropriate for the moisture regime of your locality
  - Prepare for drought when conditions are good
  - Use inputs moderately for consistent yields
  - Diversify to enhance farm options
  - Know what you will do before the crisis arises
- **Know how to get available assistance if droughts reach disaster levels**



# Related Presentations

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- **Soil Health and Drought**
- **Irrigation and Rainwater Harvest**
- **Pasture Health and Drought Protection**
- **Pasture and Rangeland Management During Drought**
- **Water Management, Drought, and Heat Stress**



# Illustration Credits

<b>SLIDE</b>	<b>CREDITS</b>
<b>Cover</b>	<b>International Commission on Irrigation and Drainage</b>
<b>What is Drought?</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Drought Defined by Climate</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Moisture Imbalance and Drought</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Drought Management</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Land Capability: Crops and Forages</b>	<b>USDA Natural Resources Conservation Service</b>



# Illustration Credits

<b>SLIDE</b>	<b>CREDITS</b>
<b>Land Capability: Livestock &amp; Forages</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Balance Water Needs and Availability</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Water Capture and Retention</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Diversity Decreases Risk</b>	<b>Gail E. Wagner</b>
<b>Drought -Tolerant Plants</b>	<b>The Samuel Roberts Noble Foundation, Ardmore, Oklahoma</b>
<b>Irrigation Concerns</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Related Presentations</b>	<b>USDA Natural Resources Conservation Service</b>

