What is Drought?

- **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

- 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

• 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

- 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

• 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

- 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

- 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

- 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

- 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

• 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

- 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

• 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

- 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

• 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

- 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

- 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

• 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

- 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
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