





# ◦ Drought

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## Drought Preparedness

### Overview:

- A drought is a prolonged period of abnormally low precipitation that can result in water shortages, soil moisture deficits, and ecosystem stress.
- Droughts can lead to reduced agricultural productivity, land degradation, and water scarcity, impacting communities, economies, and ecosystems.

### Causes:

- Meteorological Drought: Below-average rainfall and limited precipitation over an extended period contribute to meteorological drought conditions.
- Agricultural Drought: Soil moisture deficits and inadequate irrigation water availability affect crop yields, livestock production, and food security.
- Hydrological Drought: Reduced streamflow, groundwater levels, and reservoir storage characterize hydrological droughts, impacting water supply and availability.

### Effects:

- **Soil Desiccation:** Droughts can lead to soil moisture depletion, desiccation, and compaction, affecting soil structure, fertility, and plant growth.
- **Land Degradation:** Reduced vegetation cover, soil erosion, and land subsidence can occur during droughts, leading to land degradation, habitat loss, and ecosystem disruption.
- **Crop Failure:** Water stress, heatwaves, and inadequate irrigation water can result in crop failure, reduced yields, and economic losses for farmers and agricultural industries.

## **Preparedness:**

### **1. Soil Conservation:**

- Implement soil conservation practices such as mulching, cover cropping, and contour plowing to reduce soil erosion, retain moisture, and improve soil health.
- Minimize soil disturbance and tillage operations to preserve soil structure, organic matter, and microbial activity during dry periods.

### **2. Water Management:**

- Adopt water-efficient irrigation techniques such as drip irrigation, furrow irrigation, and micro-sprinklers to optimize water use and minimize soil moisture loss.
- Implement water-saving measures such as rainwater harvesting, greywater recycling, and soil moisture monitoring to conserve water resources and support plant growth.

### **3. Land Stewardship:**

- Practice sustainable land management techniques such as agroforestry, rotational grazing, and conservation tillage to enhance soil fertility, biodiversity, and resilience to drought.
- Preserve natural habitats, riparian zones, and wetlands to maintain ecosystem services, biodiversity, and water filtration capacity during drought conditions.

### **4. Emergency Planning:**

- Develop a drought contingency plan that includes provisions for soil moisture monitoring, crop selection, and water conservation measures

to mitigate the impacts of drought on agricultural operations.

- Identify and prioritize essential land uses such as food production, wildlife habitat, and ecosystem services, and implement adaptive management strategies to sustain land productivity and resilience.

#### **5. Community Engagement:**

- Collaborate with local farmers, landowners, and conservation groups to implement drought response and mitigation initiatives such as soil conservation projects, watershed restoration, and land stewardship programs.
- Participate in community-based resilience-building activities, workshops, and educational programs focused on drought awareness, preparedness, and sustainable land management practices.

### **Soil Vulnerability During Droughts:**

#### **Soil Desiccation:**

- Droughts can lead to soil desiccation, shrinkage, and compaction due to moisture depletion and evaporation from the soil surface.
- Soil desiccation can result in reduced water infiltration, root penetration, and nutrient availability, affecting plant growth and productivity.

#### **Soil Erosion:**

- Reduced vegetation cover and soil moisture during droughts increase the risk of soil erosion, sedimentation, and loss of topsoil.
- Wind erosion, water runoff, and surface crusting can exacerbate soil erosion and land degradation, leading to reduced soil fertility and productivity.

#### **Land Subsidence:**

- Drought-induced soil moisture deficits can contribute to land subsidence, sinking, or settlement in areas with clay-rich or expansive soils.
- Land subsidence can lead to foundation damage, infrastructure instability, and increased flood risk, impacting communities, buildings, and infrastructure.

## **Safe Land Management Practices:**

### **1. Soil Conservation:**

- Implement erosion control measures such as contour plowing, terracing, and vegetative buffers to reduce soil erosion and sediment runoff during drought conditions.
- Preserve soil structure and organic matter by minimizing soil disturbance, compaction, and tillage operations, promoting soil health and resilience to drought.

### **2. Water Management:**

- Optimize irrigation scheduling and water application rates to match crop water requirements and minimize water loss through evaporation, runoff, and deep percolation.
- Enhance water infiltration and soil moisture retention by applying mulch, cover crops, and soil amendments such as compost and organic matter.

### **3. Drought-Tolerant Crops:**

- Select drought-tolerant crop varieties and species adapted to local climatic conditions and soil types, conserving water and sustaining agricultural productivity during dry periods.
- Rotate crops, intercrop, or practice crop diversification to reduce water stress, pest pressure, and soil nutrient depletion, enhancing crop resilience and yield stability.

### **4. Soil Health:**

- Improve soil fertility, structure, and biological activity by applying organic amendments, green manures, and microbial inoculants to enhance nutrient cycling and soil organic matter content.
- Monitor soil moisture levels, soil temperature, and nutrient availability to optimize plant growth, root development, and nutrient uptake during drought conditions.