

Climate Adaptation and Resilience

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Overview

- Defining climate adaptation and resilience
- Importance of and considerations for climate adaptation planning
- Climate projections
- Specific examples of adaptation
- Climate adaptation tools and resources



Climate Adaptation and Resilience

**What comes to mind
when you think about
climate adaptation
and resilience?**



Photo credit: City of Albuquerque CC by 2.0 via The
New Mexico Political Report



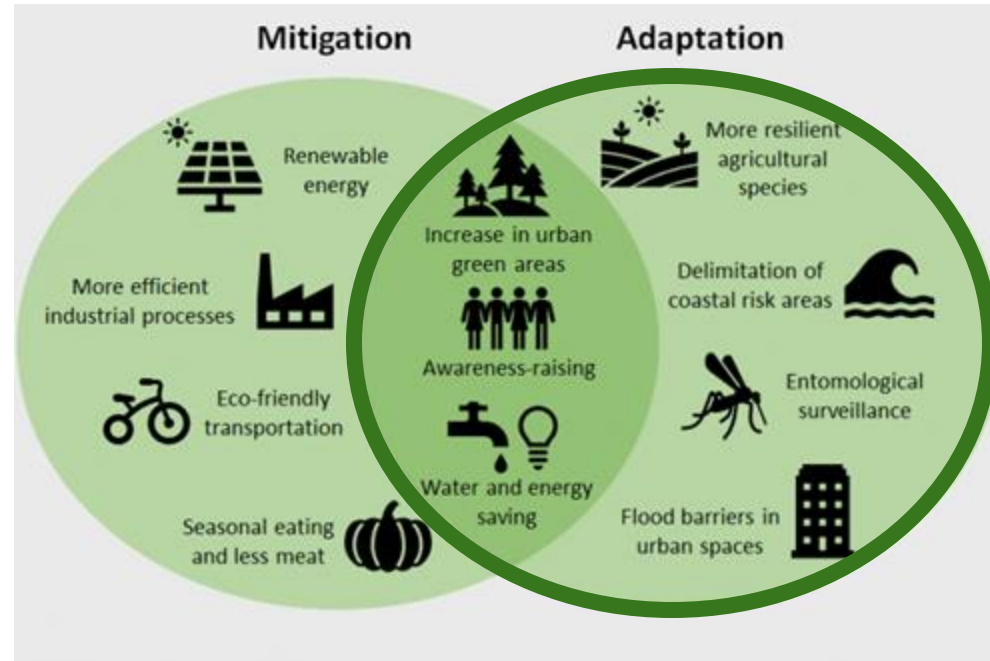
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Climate Adaptation

Hazard Mitigation - FEMA

The process of **adjusting** current practices and lifestyles **to actual or expected changes** in climate with the goal of

- Reducing climate-related risks, and
- Increasing capacity to prepare for climate impacts



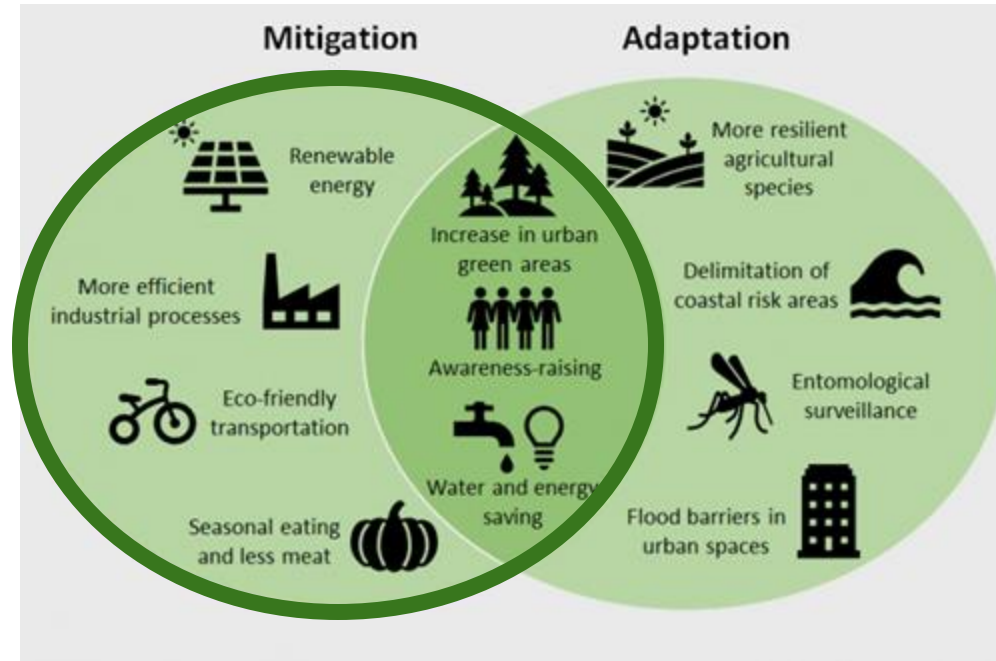
Source: Iceland Liechtenstein Group

Adaptation is one of the key ways in which humans can adapt **social, built, and natural environments** to better withstand the impacts of climate change.



Climate Mitigation

Efforts to reduce emissions or to enhance the sinks of greenhouse gases with the goal of avoiding or **reducing the effects** of climate change



Source: Iceland Liechtenstein Group

Climate Resilience

The capacity of interconnected social, economic and ecological systems **to cope with a hazardous event, trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure**. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation



International Panel on Climate Change (IPCC) Sixth Assessment Report

Adaptive Capacity and Resilience

Adaptive Capacity

Adaptive capacity is about the ability of a system to **adjust and evolve** in response to longer-term changes and uncertainties.

... Like shifting planting seasons

Resilience

Resilience is about **withstanding** and **recovering** from specific risks.

... Like having crops that can survive a drought

Adaptive capacity supports resilience of a system to disturbance or climate impacts



Impacts from Climate Change

- Drought
- Wildfire
- Flooding
- Extreme heat
- Loss of biodiversity and culturally significant places, plants, and animals

NEW MEXICO NEWS

PICTURES: Rain over burn scars causes flooding in New Mexico communities



USDA Forest Service



Shania McAdams

KRQE News



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Climate Adaptation Planning

- Engage, center values, goals, objectives
- Assess vulnerability and anticipate climate impacts
- Identify and implement strategies
- Monitor, assess, and adapt

Climate Adaptation Planning



Using Climate Projections to Anticipate Change

Human / Societal Action

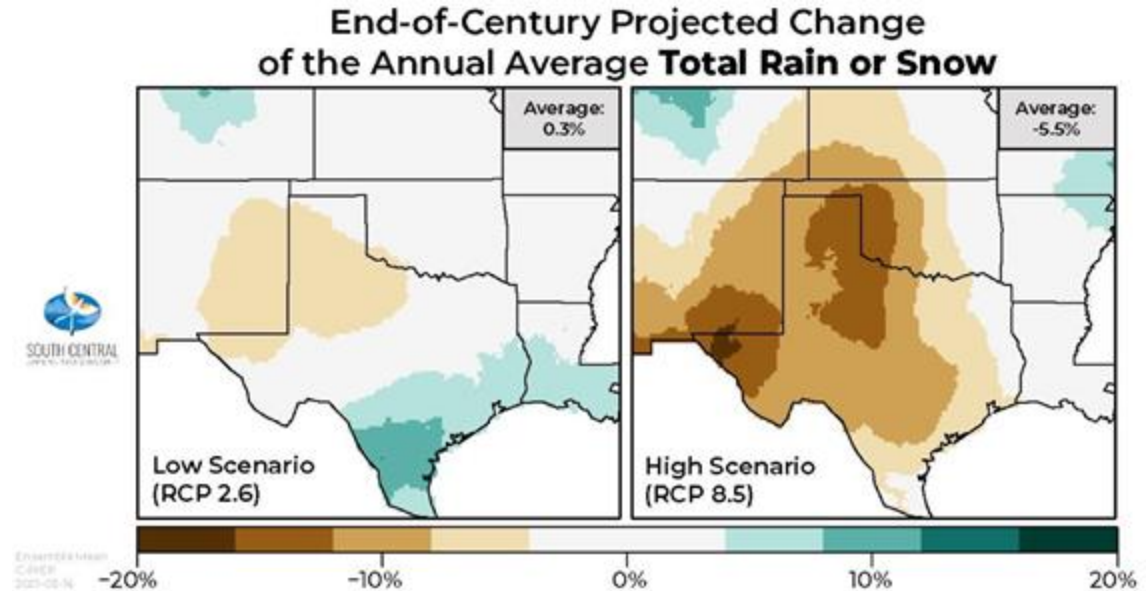
- Emissions Scenarios

Global Climate Models

- Physical Science Based

Downscaling

- Translating Large Scale to Local Scale



Importance of Adaptation

Climate Uncertainty and Immediate Risks

Adaptation addresses current and future climate uncertainties and risks, complementing mitigation efforts.

Ecosystem and Societal Resilience

Adaptation protects ecosystems, biodiversity, and communities, enhancing resilience to climate impacts.

Sustainable Development and Stability

Adaptation supports sustainable development and economic stability by reducing disruptions and losses from climate change.



Examples of Adaptation Strategies

- **Knowledge sharing and cultural practices** – education, mindful observation, practices of reciprocity, maintaining and revitalizing relationships in a changing landscape
- **Watershed and wildfire resilience** – forest restoration, fuels reduction, prescribed and cultural burning
- **Infrastructure upgrades** – building climate-resilient infrastructure (green roofs, cooling, etc.), flood protections, low impact development
- **Emergency management** – hazard mitigation planning, planning for extreme events, water scarcity, etc.
- **Agricultural practices** - drought-resistant crops, seed saving for at-risk species
- **Ecosystem-based adaptation** - wetland and riparian restoration, restoration of hydrology and soils, water quality, retain biological and cultural legacies



Regeneration of native conifer seedling (Maria Janowiak, NIACS.), Tribal Climate Adaptation Menu

Principles of Climate Adaptation

- Strategies should be locally-adapted and developed together with partners
- No one size fits all
- In many cases, adaptation requires innovation
- Fair, democratic processes for selecting appropriate adaptation strategies



Firefighters and Natural Resource Specialists wrap the General Sherman Tree with fire shelter material during the KNP Complex Fire to help protect it from fire burning into old cavities or fire scars.; Elizabeth Wu/NPS

Managing for Change

- Act with intentionality
- Reconsider goals, not just strategies
- Manage for change, not just persistence
- Uncertainty is part of the equation
- Recognize the limitations of adaptation
- Be flexible and creative



Stein, Bruce A., Patty Glick, Naomi Edelson, and Amanda Staudt, eds. *Climate-Smart Conservation: Putting Adaptation Principles into Practice*. Washington, DC: National Wildlife Federation, 2014.

Integrating Climate Adaptation Strategies

Strategies can be integrated into ongoing work

- Don't need to wait for specific funding
- Utilize ongoing actions



Barriers to Climate Adaptation

Despite recent advances in climate adaptation, there remain some barriers to successful implementation.

- The **rate of adaptation is insufficient** relative to the pace of climate change
- **Funding and resources are limited**
- **Collaboration can be challenging**
- Some adaptation actions can be **maladaptive** or perpetuate harm
- **Hard to measure progress**
- **Translating priorities into action is hard.**



July 2016 flood on Bad River Reservation in northern Wisconsin, Charlie Rasmussen GLIFWC, Tribal Climate Adaptation Menu

Ensuring Actions Will Be Effective

- Iterative planning
- Collaboration
- Monitor actions
- Reassess strategies, make changes as needed
- Plan for multiple benefits



Available Tools

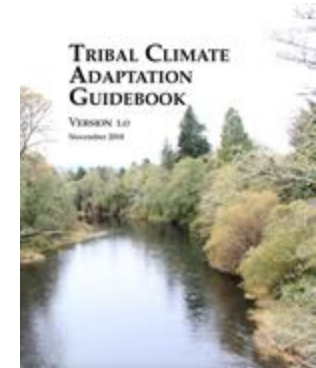
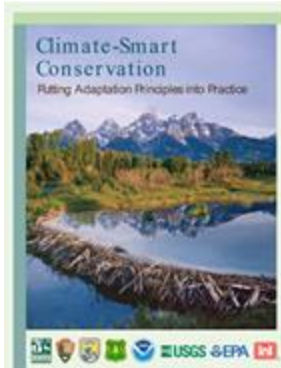
1. U.S. Forest Service Adaptation Workbook
2. Tribal Climate Adaptation Menu
3. Climate-Smart Conservation

4. Resist, Accept, Direct Framework (RAD)

5. U.S. Climate Resilience Toolkit

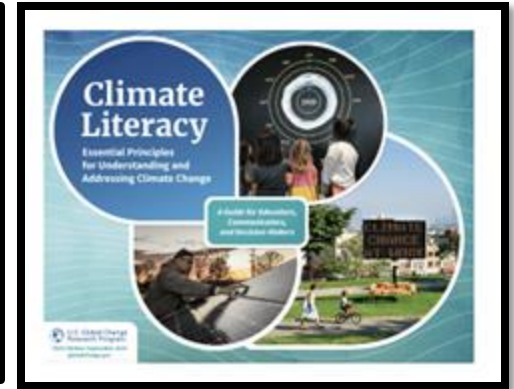
6. Climate Toolbox

7. Tribal Climate Adaptation Guidebook



Other Climate Resources

- [Intergovernmental Panel on Climate Change Sixth Assessment Report](#) (IPCC)– Global scientific assessments on climate change
- [Fifth National Climate Assessment](#) (NCA5) – Comprehensive U.S. climate impacts and projections



Connect with us with any questions

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Links to Tools

- U.S. Forest Service Adaptation Workbook
 - [Adaptation Workbook Interactive Online Tool](#)
 - [Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers, 2nd Edition](#) (publication)
- [Tribal Climate Adaptation Menu](#)
- [Climate Smart Conservation](#)
- Resist, Accept, Direct Framework (RAD)
 - [Resist-accept-direct \(RAD\)-A framework for the 21st-century natural resource manager](#) (Schuurman et al. 2020)
 - [Responding to Ecosystem Transformation: Resist, Accept, or Direct?](#) (Thomson et al. 2020)
 - [Managing for RADical Ecosystem Change: Applying the Resist-Accept-Direct Framework](#) (Lynch et al. 2021)
 - [Navigating ecological transformation: Resist-accept-direct as a path to a new resource management paradigm](#) (Schuurman et al. 2022)
- [NOAA U.S Climate Resilience Toolkit](#)
- [Climate Toolbox](#)
- [Tribal Climate Adaptation Guidebook](#)

