

RETHINKING DROUGHT

Drought affects people and nature alike. Droughts are becoming longer, hotter, and more widespread, so informed planning is crucial to reduce harmful effects. The Ecological Drought Framework presents a new way of thinking about drought. It shows how both people and nature affect an area's **EXPOSURE** to drought, its **SENSITIVITY** to drought, and resulting **IMPACTS**, all of which feed back into the cycle. The framework gives decision makers a roadmap with several intervention points for reducing drought vulnerability.



THE ECOLOGICAL DROUGHT FRAMEWORK

PEOPLE



LAND AND WATER USE

People alter water cycles by pumping groundwater or diverting rivers, for example, which can reduce water reserves.



CLIMATE CHANGE

Higher temperatures from climate change are increasing evaporation and altering precipitation, which increase an area's exposure to drought conditions.



NATURAL RESOURCE MANAGEMENT

How people manage resources influences how species and ecosystems respond to drought. For example, thinning trees can reduce a forest's sensitivity to drought.



ECOSYSTEM SERVICE IMPACTS

Drought impacts the benefits people gain from nature, called ecosystem services, like clean water and air. This in turn impacts their livelihoods and well-being.

NATURE



METEOROLOGICAL DROUGHT

Sea surface temperatures, ocean-atmosphere interactions, and climate variability control drought.



LANDSCAPE CHARACTERISTICS

Water availability differs across landscapes. For example, a north-facing slope, a shaded river, or soils with a high water-holding capacity may have less exposure to drought.



ECOLOGICAL CHARACTERISTICS

The ability of species and ecological communities to tolerate drought determines an ecosystem's sensitivity and capacity to adapt. For example, some plants and animals have traits that allow them to avoid water stress during drought.



ECOLOGICAL IMPACTS

Drought can impact ecosystems in a variety of ways, some minor and some transformational - e.g., forests turning into shrublands or entire streams drying up. The level and type of ecological impacts determine future exposure and sensitivity to drought.

EXPOSURE

SENSITIVITY

IMPACTS

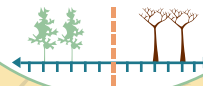
ECOLOGICAL DROUGHT

noun | ēkə'lājīk(ə)l drout :

Ecological drought is, "an episodic deficit in water availability that drives ecosystems beyond thresholds of vulnerability, impacts ecosystem services, and triggers feedbacks in natural and/or human systems." Unlike traditional understandings of drought, ecological drought incorporates all of its ecological, climatic, hydrological, socioeconomic, and cultural dimensions.

the
THRESHOLD of
•VULNERABILITY•

Human and natural systems can adjust to a certain amount of drought before they are irreversibly altered. Reducing systems' vulnerability to drought can lower the risk of reaching this tipping point.



A WIN-WIN FOR PEOPLE AND NATURE

Reducing nature's vulnerability to drought safeguards the ecosystem benefits people depend on, thus protecting both nature and human well-being.



Source: S. Crausbay, A. Ramirez, et al., 2017: Defining ecological drought for the 21st century. Bull. Amer. Meteor. Soc. doi:10.1175/BAMS-D-16-0292.1, in press.