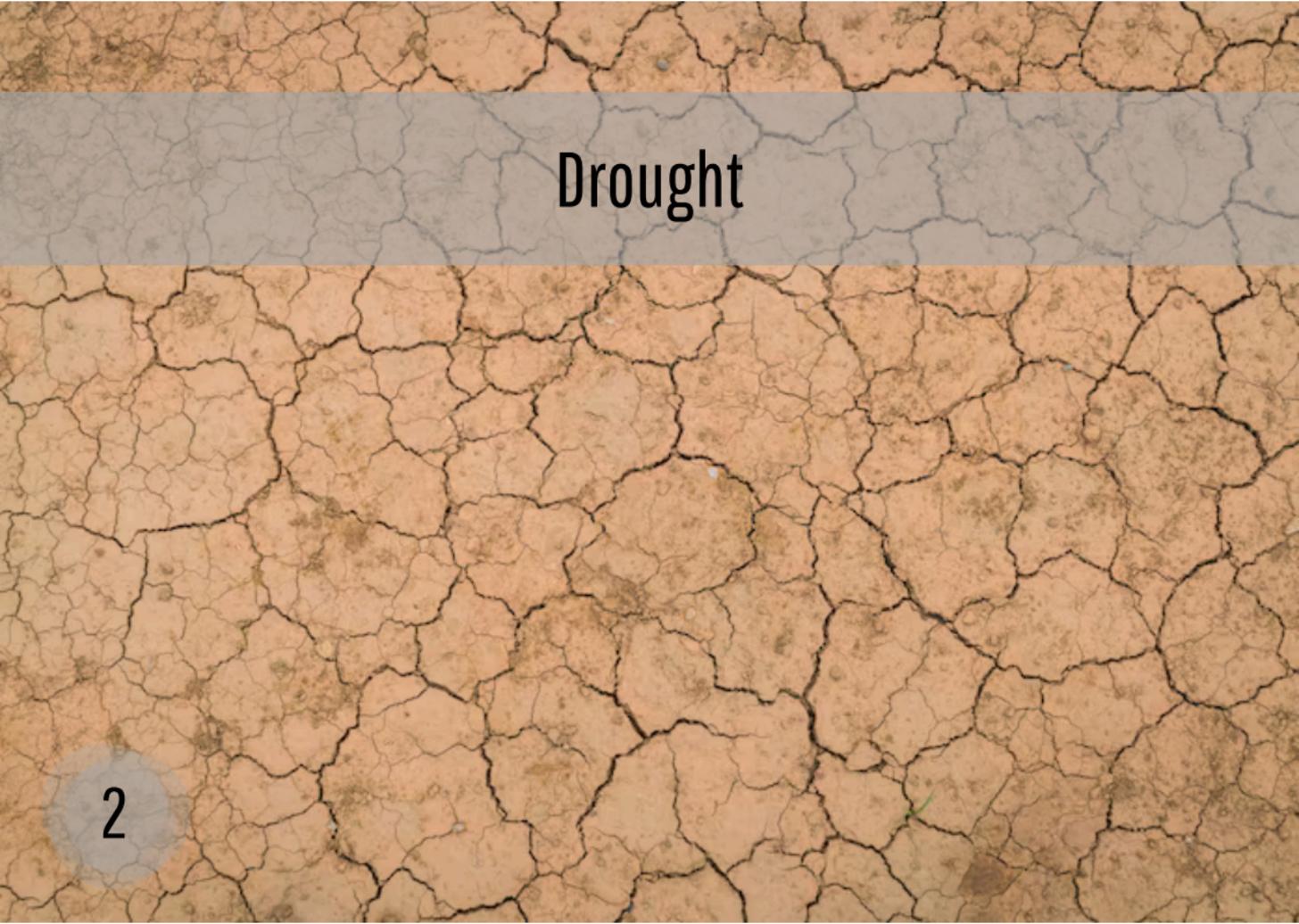


Climate change



Human-induced climate change increases global temperatures and disrupts rainfall patterns. As the atmosphere warms, heatwaves become more intense and more frequent, while precipitation becomes more erratic. This leads to drier vegetation and soil, setting the perfect stage for wildfires. Even areas that didn't traditionally burn are now facing fire risks.



Drought

2

Drought, intensified by climate change, dries out soil and vegetation, creating ideal conditions for wildfires. With less water, plants weaken and die, forests lose their natural fire resistance, becoming fuel for flames and increasing the frequency and intensity of wildfires. As ecosystems degrade, fires become more frequent and destructive.

Wildfires



Wildfires are both a cause and a consequence of environmental disruption. Human activities like deforestation and intensive land use dry out ecosystems, contributing to drought and disrupting the water cycle. As forests burn, carbon sinks are lost, greenhouse gas emissions rise, and air and water pollution increase. The result is a cascading collapse of biodiversity and ecosystem stability.

Air pollution & greenhouse gas emissions

4

When wildfires burn, they release significant quantities of greenhouse gases (GHGs), including CO₂, CH₄, and NO_x, reinforcing global warming. They also emit dangerous air pollutants like fine particulate matter, acrolein, formaldehyde, benzene, and polycyclic aromatic hydrocarbons. These substances degrade air quality and pose major public health risks.

Water pollution



Wildfires contaminate water with ash, metals, and chemicals. When vegetation burns, ash and toxic substances (like heavy metals or Cr(VI)) are released into soil and rivers, contaminating freshwater. Water treatment becomes difficult, especially in affected communities that rely on surface water. These pollutants can exceed safe drinking limits and pose a serious public health risk.

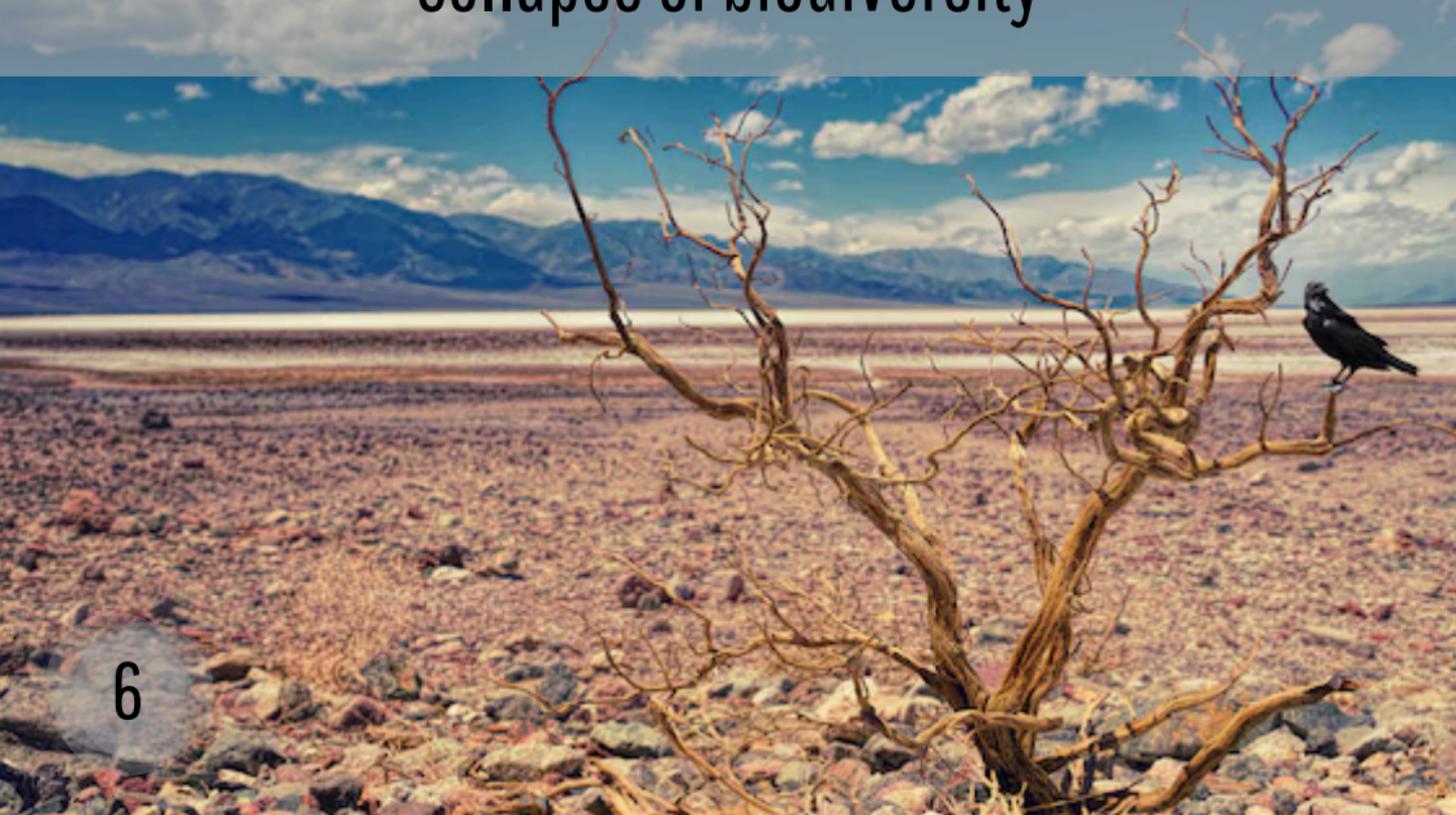
Disrupted water cycle

9



Wildfires disrupt the natural water cycle by destroying vegetation, the soil becomes compacted and less permeable. This leads to reduced rainfall absorption, increased runoff, and soil erosion. As a result, communities face water shortages, degraded water quality, and greater risks of floods and landslides, impacting health and agriculture.

Collapse of biodiversity



Biodiversity collapse weakens entire ecosystems. Wildfires destroy habitats and wipe out species, while ash and toxic runoff pollute waterways, harming aquatic life. As nature's balance breaks down, we lose essential ecosystem services (clean water, fertile soil, pollination) directly threatening food security, health, and human well-being.

Human and social consequences



Human and social consequences are deeply tied to environmental breakdown. Air pollution and greenhouse gas emissions increase health risks and intensify climate extremes. A disrupted water cycle and water pollution reduce access to clean water and threaten agriculture. Biodiversity collapse erodes food security and resilience, amplifying inequalities and forcing communities to adapt or migrate.

Human activities



Human activities like industrial agriculture, deforestation, and urban expansion alter land use, degrade soils, and dry out landscapes. These changes increase the risk of wildfires and reduce nature's ability to store carbon. By emitting greenhouse gases and disrupting ecosystems, these actions drive climate change and intensify its impacts.



Deforestation

When forests are cleared for agriculture the exposed land becomes more vulnerable and burn faster. As trees are cut, natural carbon sinks disappear, increasing atmospheric CO₂. Deforested areas also become more vulnerable to wildfires, as dry, exposed soils and leftover vegetation act as fuel for flames.

Agriculture & Land Use

An aerial photograph of a rolling agricultural landscape. The foreground and middle ground are dominated by a golden-brown field, likely harvested wheat or corn, with numerous round hay bales scattered across it. In the background, there are green fields, possibly alfalfa or other forage crops, arranged in curved rows. The terrain is hilly, and the sky is a clear, pale blue.

Agriculture and land use changes (like deforestation, overgrazing, and crop burning) are major contributors to wildfire risk. Practices such as slash-and-burn farming also directly ignite fires. These activities weaken ecosystems and reduce their ability to act as carbon sinks. This leads to more frequent and intense wildfires.

An aerial photograph of a dense forest with a semi-transparent title bar. The forest is composed of many trees with varying shades of green and yellow, suggesting a mix of species or a seasonal change. The title bar is a horizontal band across the top of the image, containing the text "Carbon Sink Disruption" in a bold, black, sans-serif font.

Carbon Sink Disruption

12

Forests, act as natural carbon sinks, absorbing about 1/3 of global CO₂ emissions. Droughts, deforestation, and wildfires can severely reduce this capacity. When vegetation burns, the stored carbon is released back into the atmosphere as CO₂. This disruption weakens our natural defenses against climate change and increases atmospheric CO₂ levels.