



Health Impacts of Land Degradation & Drought

This policy brief focuses on the intricate connections between health, land and drought, offering evidence on health impacts through various pathways resulting from desertification, land degradation and drought (DLDD). It provides recommendations for policymakers and stakeholders to address health dimensions through integrated approaches, such as One Health which emphasizes the connections between ecosystem, animal, and human health.

DLDD are interlinked hazards that affect all continents. Threatening up to 40% of terrestrial ecosystems, land degradation continues to rise globally. Between 2015 and 2019, over 100 million hectares of healthy, productive land were degraded annually, as reported by 167 governments. Eastern and Southeastern Asia, along with Latin America and the Caribbean, experienced higher proportions of degraded land compared to global averages. Sub-Saharan Africa faced degradation at rates higher than the global average. Land degradation and drought contribute to biodiversity loss, intense wildfires, and sand and dust storms.

DLDD exacerbates public health risks through complex pathways. Ecosystem integrity, biodiversity, food security, water availability, soil health, vegetation, and air quality are key links between DLDD and health risks. Environmental determinants of health—nutrition, safe drinking water, and clean air—are closely tied to healthy ecosystems. This policy brief presents the Global Drought Vulnerability Index, showing regional patterns similar to maps of global disease burdens, including child malnutrition.

Land degradation and drought are associated with communicable, non-communicable, and injury-related diseases. Studies show drought and land conversion influence zoonotic diseases like Ebola and COVID-19. Research links drought events to increased HIV infection and diarrheal diseases. High dust levels correlate with asthma, respiratory infections, and higher mortality during sand and dust storms. Wildfire smoke is linked to a range of respiratory health outcomes—including asthma, chronic obstructive pulmonary diseases, respiratory infections, and higher mortality—as well as cardiovascular, ophthalmic and mental health disorders.

The chain from pathways to health impacts requires integrated policy responses. Effective interventions include land restoration, sustainable agriculture, improved water management, and early warning systems. Health-specific actions involve adopting a One Health approach, strengthening health sector capacity, partnering across sectors, and implementing World Health Organization's (WHO) Global Action Plan on Climate Change and Health.

There is a need for gender-sensitive solutions. Ensuring women's land rights can improve productivity, reduce malnutrition, and build resilience. Supporting water access for women and girls, who often bear responsibilities for collecting water, further reduces health risks. Vulnerable populations, especially women and children in low- and middle-income countries, face higher risks and stand to benefit most from inclusive policies.

There is an urgency to act now under global collaborative leadership. The benefits of action exceed the costs of investing in research, resilience, surveillance, early warnings, risk communication, gender-sensitive interventions, finance, and community empowerment. Leadership from UN entities, including WHO and UNCCD, is essential to drive policies that protect human health and build resilience across all sectors.

DLDD exacerbates health impacts

Regional disparities in DLDD

Desertification, land degradation, and drought (DLDD) are interconnected hazards overlapping in many parts of the world (see Fig 1). The UNCCD defines:

- **Land degradation** as the loss of biological or economic productivity and complexity of land arising from human activities.
- **Desertification** as land degradation in drylands.
- **Drought** as a natural phenomenon of below-average precipitation, which can last months or years, while **water scarcity** arises from a long-term, human-induced imbalance between water demand and supply.

The UNCCD Parties focus on DLDD due to their widespread impacts on livelihoods, health, and wellbeing. Between 1970 and 2019, drought was among the deadliest natural hazards, causing approximately 650,000 deaths worldwide. From 2015 to 2019, at least 100 million hectares of productive land was degraded each year, affecting global food and water security.

Eastern and Southeastern Asia, Latin America and the Caribbean experienced a higher-than-average proportion of degraded land (24.4% and 19.6% respectively), while Sub-Saharan Africa experienced land degradation at a higher-than-global-average proportion, increasing from 7.1% to 14.5%. DLDD also contributes to hazards like sand and dust storms and wildfires. Drylands cover 41% of global land, with Asia and Africa home to half of these populations, the population living in drylands is projected to double to over 5 billion by 2100.

Poor health outcomes from DLDD Example – Malnutrition

Malnutrition is unevenly distributed and disproportionately affects certain vulnerable populations, especially those living in regions more susceptible to food insecurity. Studies have found a strong association between food insecurity and stunting among children under five. By affecting agricultural production, as well as water availability and quality, DLDD contributes to increasing food insecurity and malnutrition in low- and middle-income countries.



The Institute of Health Metrics and Evaluation (IHME) found that among the top 10 risk factors for disease burden among children globally in 2021, low birth weight and child underweight appear at the first and third positions (IHME, 2024). Figure 2 presents a map of the prevalence of stunting among children under five in low- and middle-income countries using data from 2006–2018. Subgroup analyses suggested that Western Africa, Southern Asia, and Southeastern Asia had a substantially higher estimated prevalence of undernutrition than the global average.

Figure 1 Global map of six aridity index (AI) classes for 1991-2020

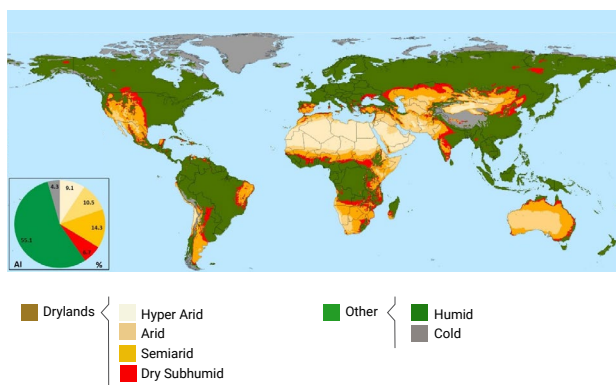
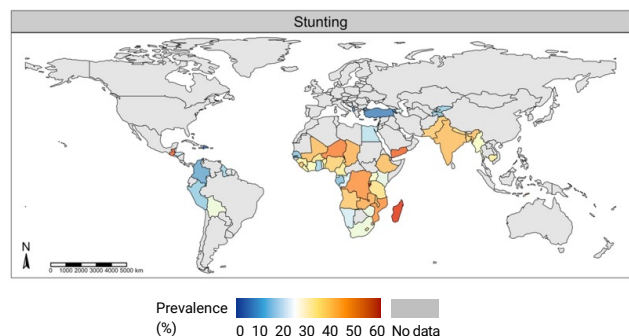


Figure 2 Map of malnutrition through stunting among children under five in low- and middle-income countries (2006-2018 data)



DLDD impacts on health through complex pathways

DLDD often overlap geographically and affect health through a range of complex pathways, including biodiversity loss, ecosystems disruption, reduced water availability and quantity, decreased agricultural production, soil degradation, wildfires, and sand and dust storms.

Figure 3 Illustration of the interconnections between DLDD and health

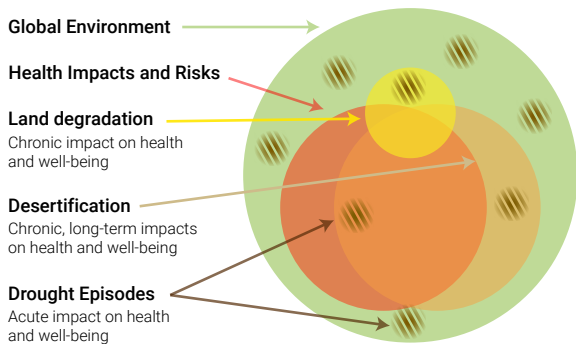


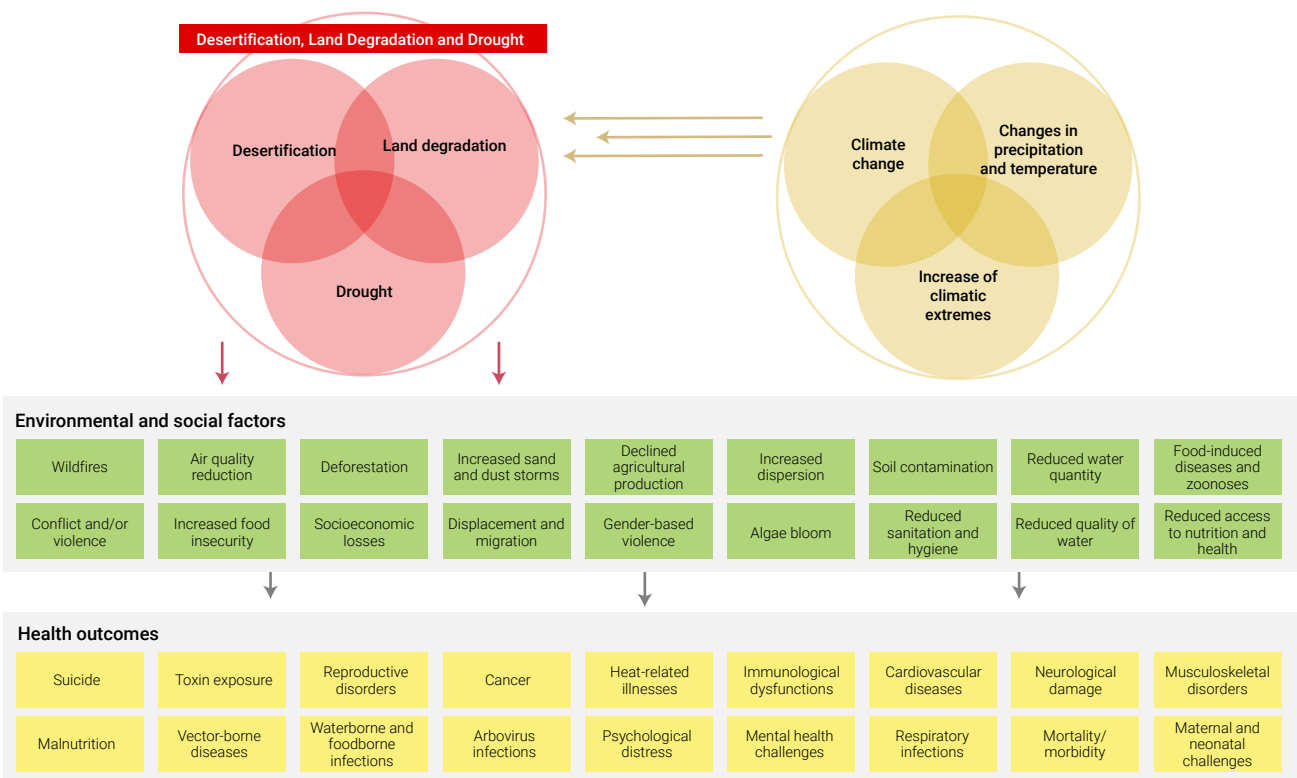
Figure 3 shows how the overlap among desertification, land degradation and drought can affect health of communities individually or jointly. Land degradation can happen in areas with desertification processes underway, as well as in other environmental contexts. Drought episodes can occur where land degradation and desertification are also happening, as well as in other contexts without these factors.

Desertification, land degradation, and drought episodes are all happening in the wider context of the global environment, which is heavily impacted by climate change. The health circle of the figure illustrates that impacts occur over the three hazards, including their overlaps, and involve acute and long-term risks. Desertification and land degradation have long-term and chronic impacts on health and well-being, while drought episodes have more acute and short-term impacts.

Climate change pathways

Figure 4 illustrates that climate change is playing a major role on all factors, exacerbating the impacts of DLDD on health and wellbeing. The frequency and severity of sand and dust storms and wildfires are influenced by drought and land degradation, leading to increases in air pollution that can affect health and well-being. The WHO estimates that globally, 330 million people have daily exposure to particles transported by wind, including the cross-border transfer of fine particles carrying pathogens and harmful substances which cause acute and chronic respiratory problems.

Figure 4 Illustration of climate change exacerbating role in health impacts from DLDD



How DLDD leads to negative health outcomes

Environmental pathways

- (i) **Food insecurity** resulting from the loss of agricultural production, reduced crop yields, and reduction of food production contributes to malnutrition, mental health challenges, and displacement.
- (ii) **Water scarcity** due to decreases in water quantity and quality linked to drought contributes to increased risks of water-borne diseases.
- (iii) Changes in **disease-carrying vectors'** habitat and range contribute to increase in mosquito and tick-borne diseases.
- (iv) **Reduced air quality** due to increasing sand and dust storms and wildfires affect respiratory issues and infectious diseases.
- (v) **Land use changes** resulting from land conversion and biodiversity loss can increase exposure to disease vectors and lead to zoonotic disease (diseases that can be transmitted from animals to humans) and to outbreaks of emerging diseases (eg. Ebola, COVID-19)
- (vi) **Biodiversity loss** due to loss of habitat for plants and animals can increase vulnerability to extreme heat stresses, cardiovascular diseases, mental health disorders.
- (vii) **Soil degradation and contamination** can create conditions which increase the risk of soil-transmitted infections, respiratory diseases, and anthrax.

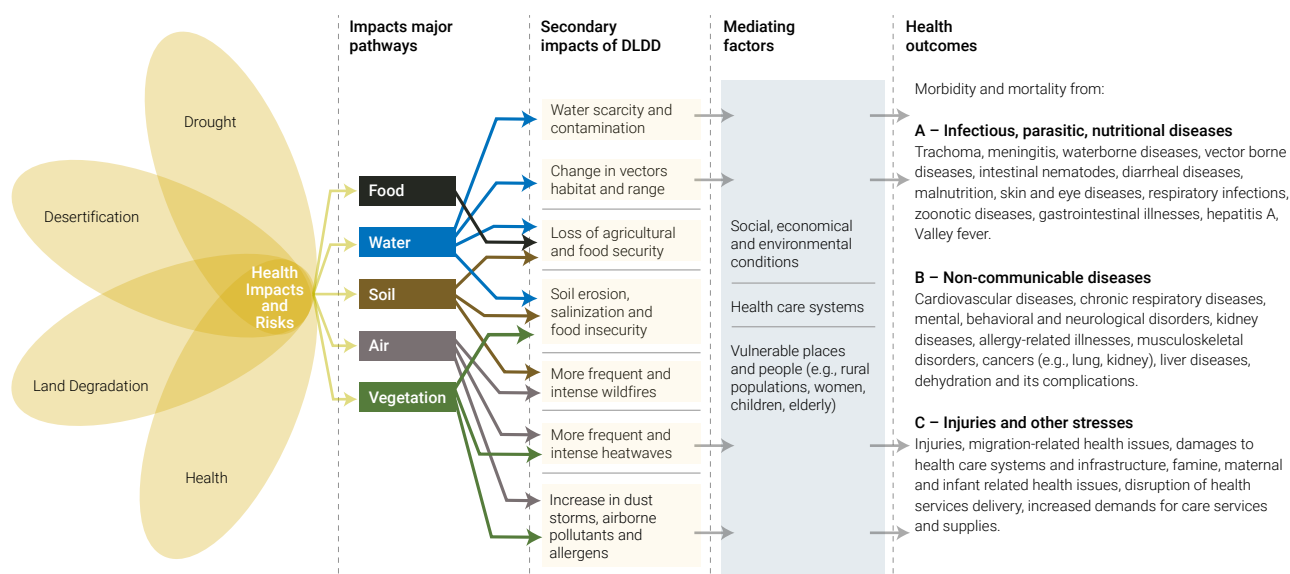
Major health outcomes

- (i) **Communicable diseases** (particularly infectious diseases) including cholera, malaria, soil-transmitted infections, HIV, etc.
- (ii) **Non-communicable diseases** including cardiovascular and respiratory conditions and malnutrition
- (iii) **Mental health disorders** like anxiety and depression due to displacement and resource scarcity
- (iv) **Injuries and other stresses** resulting in more morbidity and mortality, e.g. linked to heatwaves during droughts, migration-related health issues, and damages to health care systems



Figure 5

Illustration of pathways to health outcomes from DLDD, and health interconnections, including environmental and other mediating factors



Growing body of evidence on the health impacts of DLDD

There is growing evidence of the impacts of DLDD on communicable diseases, particularly from studies focused on arbovirus infections, respiratory infections, waterborne diseases, and foodborne diseases. Research on non-communicable diseases related to DLDD are primarily connected to bone diseases, cardiovascular diseases, cancer, heat related illnesses, liver diseases, malnutrition, mental health conditions, and reproductive disorders.

Health outcomes

Resulting from drought	Resulting from land degradation	Specific impacts on women and children
Drought conditions found significantly associated with malnutrition, particularly with both wasting and underweight prevalence	Land-use change playing a role in the transmission of several diseases, including Anthrax, the emergence and the spread of zoonotic diseases such as Ebola and Covid-19	One in four children globally (27%) lives in severe child food poverty in early childhood (181 million children under 5 years of age)
Impacts on disorders and miscarriage risk from carrying water either for long distances or frequency	Disruptions in water quantity and quality from land degradation leading to the spread of waterborne diseases like diarrhea and cholera	Association of land degradation and drought with increasing rates of morbidity and mortality among children and women
Association found between drought and skin and eye infections (e.g. trachoma, scabies, conjunctivitis)	Disrupted agricultural systems and reduced food production leading to malnutrition, weakening the immune system to infections like respiratory infections, coronavirus, and tuberculosis	Girls found more vulnerable to malnutrition than boys in drought settings
Strong associations found between exposure to long-term drought and elevated diarrhea risk among children under five. The association is stronger among children living in a household that needed a longer time to collect water or had no access to water or soap/detergent for handwashing	Land use change and creation of stagnant water pools from altered drainage patterns providing ideal breeding sites for mosquitoes, leading to vector-borne diseases like malaria and dengue	Water-carrying role in some societies exposed women and girls to physical loads causing musculoskeletal disorders
Association found between drought and HIV and the spread of zoonotic disease	Impacts of land degradation on soil-transmitted infections and airborne diseases	HIV infection rates rise likely because of drought-induced economic impoverishment pushing women into sexual risk behaviors
Association found between drought and vector-borne diseases (like malaria, dengue, Zika)	Impacts on skeletal and bone diseases from contaminants entering the food chain or water supply	Women experienced higher rates of respiratory-related mortality compared to men during drought events in the Upper Midwestern United States
Associations found between drought and non-communicable diseases	Impacts on cardiovascular diseases, such as hypertension, heart attacks, and stroke, risk of cancer, and mental health disorders	
Mental health disorders increase during prolonged drought periods. Generalized anxiety disorder, exacerbated by the stress and uncertainty associated with droughts, is projected to cost health systems \$198 billion by 2050		
Sand and dust storms directly linked to hospital admissions for respiratory conditions and contributing to the risks of death and of increased outbreaks of meningococcal meningitis in some regions		



Examples of the impacts of DLDD on health



Impact of drought on maternal and infant health in Zambia

Drought increased maize prices, reducing maternal nutrition and leading to stunted infant growth among urban middle-class populations. Infants whose mothers were pregnant during the price hike experienced notable stunting by 6 and 16 weeks of age.



Drought and mental health in Australia

Prolonged drought exacerbated food insecurity and psychological distress, particularly in rural areas. Individuals experiencing financial constraints and consuming lower levels of nutritious foods or higher levels of unhealthy discretionary foods exhibited significantly higher levels of psychological distress.



Increased rates of respiratory illnesses in South America

Drought-driven stressors in the region have been linked to increased rates of respiratory illnesses due to particulate matter exposure, as well as higher risks of infectious diseases such as leptospirosis. Vulnerable groups, including children and the elderly, face compounded risks due to limited access to clean water, healthcare, and adaptive resources.



Dust emissions and anthropogenic pollutants impacts in China

In eastern China, severe wintertime haze episodes have been exacerbated by interactions between natural dust emissions and meteorological factors. The interplay between natural dust and anthropogenic pollutants intensified haze, with aerosol particles worsening public health outcomes by bringing harmful substances to vulnerable populations.

Sector-specific and integrated responses to the DLDD-health nexus

To enhance health protection, there is a need to combine specific sectoral solutions with more integrated approaches, including a more active role of the health sector. Health specific interventions focus on implementing a robust One Health approach and capacity strengthening of the health sector to address health threats and partners in cross-sector programs.



Specific responses to DLDD

- Achieve Land Degradation Neutrality (LDN) by 2030 and a nature-positive world by 2050
- Promote sustainable agriculture
- Encourage ecologically sound land restoration
- Increase the quantity and quality of water
- Improve water management
- Introduce changes in technologies and practices in water usage and agriculture
- Raise awareness at all levels
- Strengthen early warning systems

Specific responses to health

- Promote the One Health approach
- Build the health sector's capacity to partner in projects, programs, and initiatives addressing DLDD and environmental crises
- Strengthen the health sector workforce to be able to collaborate in synergy with the other sectors
- Train healthcare professionals to address environmental health challenges
- Enhance health systems' resilience through better infrastructure and capacity building
- Support programs for prevention of disease outbreaks
- Support the implementation of the 2025 WHO Global Action Plan on Climate Change and Health



Integrated responses to health & DLDD

- Promote frameworks that connect climate, land degradation, drought, ecology, community values, spirit and culture, business, and long-term economic sustainability
- Foster cross-sectoral collaboration
- Invest in adaptive technologies and behavior change initiatives, with an increased understanding and respect of socio-cultural environments, including gender and equity
- Increase finance for multidisciplinary and transdisciplinary health research and integrated public health programs
- Promote transitioning and changes in technologies and behaviors

Key recommendations

Collaborative leadership on global initiatives such as the Integrated Drought Management Programme will further promote and strengthen solutions that protect human health, especially the most vulnerable populations such as women and children, and build resilience across all sectors.

Move towards integrated policies

- Ensure that global policy development translates into nationally appropriate policies
- Integrate health priorities into land use planning, environmental management and agricultural policies
- Increase the involvement of non-governmental organizations, community associations, municipalities, international organizations
- Incentivize and maintain cross-sectoral collaboration between the health sector and other sectors, particularly sectors managing major determinants of health (e.g., agriculture, water, and environment)
- Develop frameworks and guidance documents on integrating health into drought action plans
- Support the implementation of the 2025 World Health Organization's Global Action Plan for Climate Change and Health

Promote gender equity in action

- Reinforce policies with a gender perspective, considering the differentiated challenges faced by men and women
- Consider gender-specific indicators and data disaggregated by sex and age
- Increase attention to equity and ensure to engage women and men in preparedness
- Increase awareness of local community leaders on how to address socio-cultural barriers to women's participation

Strengthen community resilience

- Ensure that national integrated policy development is translated into action at the community level
- Empower communities with tools and resources for adaptive action
- Promote drought-smart technologies and sustainable land management practices
- Implement more synergistic and combined measures that capitalize on co-benefits and are more cost-effective
- Invest more in infrastructure within health facilities and their immediate physical environment
- Provide resources and tools for health departments and agencies, to communicate effectively to vulnerable populations

Strengthen capacity building and research

- Expand course curricula in medical and public health schools and faculties, on environmental health, including continuing education for current workforce development
- Invest in interdisciplinary, multidisciplinary and transdisciplinary research that focuses on vulnerability assessments and land degradation and drought related health outcomes
- Increase surveillance and health data collection for populations in cities, regions and countries mainly affected by DLDD, including the secondary outcomes of drought, such as sand and dust storm, heatwaves, and wildfires

Strategically target financing

- Reorient funds (from subsidies to innovative finance tools) towards healthy land – healthy people outcomes
- Broaden the scope of projects and programs under existing environmental financing mechanisms to ensure health impacts are targeted in their programming documents, guidelines and processes
- Improve communication with health sector actors by sharing the guidelines and processes from international funds, such as the Green Climate Fund, Global Environment Facility, Adaptation Fund, Climate Risk and Early Warning Systems. The UNSG Early Warnings for All Initiative has been launched to enable all countries to have functional Early Warning Systems by 2027
- Mobilize both conventional and innovative finance, including from public and private investors (e.g. ecosystem services payments, carbon emission offsetting, insurance coverage and investments)
- Allocate increased targeted funds for DLDD-specific health strategies and activities

Build bridges across global organizations

- Strengthen the roles of UNCCD and WHO in coordinating DLDD-health interventions
- Encourage integrated fast-track assessments—such as those led by the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the UNCCD Science-Policy Interface (SPI), and the WHO—as was done during the COVID-19 response
- Develop guidance to help countries build such bridges at the national level

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Health Impacts of Land Degradation & Drought

Countering the complex pathways of health impacts through specific and integrated responses

Desertification, land degradation, and drought exacerbates public health risks through complex pathways involving ecosystem integrity, biodiversity, food security, water availability, soil health, vegetation, and air quality. Environmental determinants of health such as nutrition, safe drinking water, and clean air are closely tied to healthy ecosystems.

Land degradation and drought are associated with communicable, non-communicable, and injury-related diseases. Studies show drought and land conversion influence zoonotic diseases like Ebola and COVID-19. Research links drought events to increased HIV infection and diarrheal diseases. High dust levels correlate with asthma, respiratory infections, and higher mortality during sandstorms.

Wildfire smoke is linked to a range of respiratory health outcomes including asthma, chronic obstructive pulmonary diseases, respiratory infections, and higher mortality as well as cardiovascular, ophthalmic, and mental health disorders. Therefore, breaking the complex pathways of health impacts due to DLDD requires a blend of specific and integrated responses.

Some key recommendations of this policy brief include:

- Integrating health priorities into land use planning, environmental management and agricultural policies
- Reinforcing policies with a gender perspective, considering the differentiated challenges faced by men and women
- Strengthening community resilience through access to tools and resources for adaptive action
- Investing in interdisciplinary, multidisciplinary and transdisciplinary research that focuses on vulnerability assessments
- Mobilizing both conventional and innovative finance, including from public and private investors (e.g. ecosystem services payments, carbon emission offsetting, insurance coverage and investments)
- Building bridges across global organizations such as the UNCCD and WHO to coordinate DLDD-health interventions

The objective of the United Nations Convention to Combat Desertification (UNCCD) is to support countries and communities with the rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions. With 197 Parties, the UNCCD unites decision makers, scientists, civil society and the private sector around a shared vision and framework for action to transform how land resources are used and managed to ensure healthy lives and sustainable livelihoods.

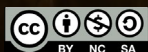


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