WEATHER AND CLIMATE

Latest El Niño is Africa's 'stress test' in climate change preparedness

As this year's powerful El Niño raises the prospect of drought, floods, and extreme heat, Africa faces a 'stress test' of resilience this summer. Jorisna Bonthuys reports.



From water-related disease outbreaks to people living in extreme heat in informal settlements, links between extreme weather, water security, and public health are becoming impossible to ignore.

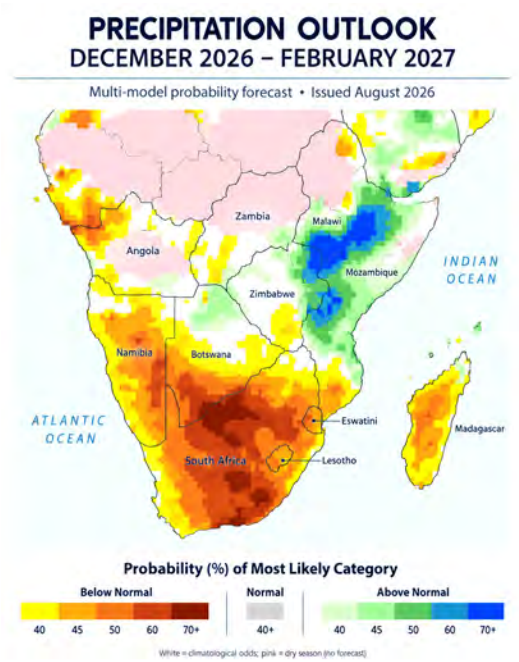
This year's El Niño has already broken many records. In the Northern Hemisphere, summer brought high temperatures and unprecedented heatwaves. Heat stress caused 35 000 excess deaths in Europe. In Dakota, an informal settlement south of Durban, the climate crisis already takes shape beneath a metal roof. Heat builds inside rooms where residents cook, sleep, and care for children. After sunset, temperatures remain high, denying exhausted bodies a chance to recover before another hot day.

These experiences bring warnings about a warmer world into sharp local focus. When extreme weather arrives, will people have water, and will the health services meant to protect them still function?

For Prof Francois Engelbrecht, a leading climatologist and director of the Global Change Institute at the University of the Witwatersrand, these questions lie at the heart of how communities and decision-makers deal with this year's El Niño event. Prof Helen Rees, executive director of the Wits Reproductive Health and HIV Institute (Wits RHI), focuses on how climate change shifts the landscape of emerging infectious diseases, including the evolving Ebola outbreak and malaria.

Both experts served as panellists in the African Academy of

CCSR/IRI Multimodel probability forecast for precipitation for December-February 2027



SA Precipitation Outlook 2026 caption – The super El Niño may lead to severe drought in southern Africa, with unprecedented heatwaves and record-breaking temperatures. A key risk is high water demand, which, in combination with water infrastructure and electricity provision issues, may result in frequent water shortages/outages.

Sciences' recent presidential lecture series, which focused on the continent's health system preparedness amid climate-change-linked disease shifts.

Prof Rees said that climate change is altering the "rhythm, reach and range" of infectious diseases on the continent and elsewhere. Both shared concerns about Africa's readiness for climate-related changes and El Niño-related challenges.

This year's event offers a "stress test in climate change preparedness", Prof Engelbrecht said. It could temporarily expose societies to extremes they will increasingly have to manage as the planet warms.

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The practical question is not simply whether Africa can get through one difficult El Niño summer. It is whether this season's El Niño response measures will remain effective when such pressures recur, intensify, or persist. For example, can authorities maintain reliable water supplies when heat-driven demand and reduced inflows occur simultaneously?

Prof Engelbrecht's research highlights the longer-term danger of severe, multi-year drought affecting Gauteng's water system – not a prediction that this single season will cause a 'Day Zero' crisis.

The 2023/24 El Niño offers a warning about how far water stress can travel through society, he pointed out.

During this event, Zambia and Zimbabwe documented maize crop losses of more than 70%. As a result, approximately 27 million people needed food assistance, while Southern African Development Community countries appealed for $5.5 billion for lifesaving support, recovery and longer-term resilience.

Water shortages also affected energy production in the region. Prof Engelbrecht mentioned depleted water supplies at Lake Kariba and major electricity outages in Zambia during this event. Closer to home, the Vaal Dam's water level dropped by 40% in one year.

Food insecurity, disrupted livelihoods and strained services also affected health systems. For subsistence farmers, repeated harvest failures threaten more than one season's income: how many devastating summers can a household endure before farming no longer sustains it?

Why this El Niño is concerning

El Niño begins thousands of kilometres from Africa, with unusually warm surface waters in the central and eastern equatorial Pacific. Events occur roughly every two to seven years and typically last nine to twelve months. Changes in atmospheric circulation can shift rainfall patterns and increase the likelihood of extreme temperatures far away.

In its latest seasonal outlook released in October, the World Meteorological Organization (WMO) reported that this El Niño was firmly established and almost certain to persist through February 2027. The WMO said the event could be unprecedented in strength across four decades of monitoring, with tropical Pacific sea surface temperatures potentially reaching 3.8°C above average from November to January.

However, an event's strength does not determine the severity of its impacts everywhere. The powerful 1982/83 and 2015/16 events brought major droughts in southern Africa; the 1997/98 event did not produce the same response.

Southern Africa generally receives less summer rainfall during El Niño, while East Africa often experiences above-normal rainfall, sometimes with flooding. Prof Engelbrecht warned that dry conditions combined with accumulated global warming could produce exceptional heatwaves across southern Africa and southern West Africa.

"If [this year's] El Niño brings the usual signal of below-normal rainfall to southern Africa, this summer will likely be the warmest on record," he said. "Zambia, Malawi, Angola, Namibia, Botswana, Zimbabwe, Mozambique, and South Africa are all vulnerable to drought during El Niño."

The South African Weather Service's latest seasonal outlook forecasts widespread dry conditions across the interior and north-eastern regions, with above-normal minimum and maximum temperatures in most areas. The warming background adds urgency. Evidence indicates that strong and very strong El Niño events will become more frequent in a warmer world.

The 2023/24 event, combined with climate change, helped push 2024 to become the planet's hottest year on record. The current event could make 2027 the hottest.

Zayan Vota/Flickr



Zambia and Zimbabwe documented maize crop losses of more than 70% during the 2023/24 El Niño.

Masixole Feni /Groundup



Vulnerable groups, including children and the elderly, are especially susceptible during extended periods of high temperatures.

Africa does not face a uniform impact, but uncertainty does not justify waiting, Prof Engelbrecht emphasised. It requires different preparations and adaptations: protecting supplies where drought threatens, and safeguarding water quality, sanitation and communities where floods may follow.

Prof Engelbrecht highlighted several major risks related to regional tipping points and extreme- event risks. More frequent, intense multi-year droughts, heatwaves and fires threaten rainfed crops and cattle production. Considering biophysical heat stress alone, sectoral tipping points are estimated at about 3°C of global warming; socioeconomic pressures could bring collapse earlier.

A multi-year drought could threaten Gauteng's water supply, he pointed out. An intense tropical cyclone could potentially reach Maputo or Richards Bay, or move into the Limpopo River valley. Durban also faces future mega-floods without a landfalling cyclone.

In addition, infectious diseases could expand their range in warmer and, in some places, more humid conditions.

Vulnerability at home

The Academy of Science of South Africa's recent regional assessment links extreme heat to mounting pressure on water, energy and health systems, disproportionately affecting those least able to protect themselves. Prof Engelbrecht identified older people, pregnant women and people with existing medical conditions as particularly vulnerable, especially in informal housing.

Research in Dakota shows how regional heat can become more dangerous indoors. During the summer of 2024–2025, researchers from the University of Cape Town, the University of Exeter and Project Empower recorded indoor temperatures frequently above 35°C and sometimes exceeding 40°C. Some readings were up to 10°C higher than those at nearby official weather stations.

Residents reported headaches, dizziness, rashes, breathing difficulties and disrupted sleep. Women doing housework and caring for others were exposed for much of the day.

The central finding is unsettling: outdoor measurements do not necessarily reflect heat risks inside homes. Dakota's heat-stress exposure creates an overlooked public-health emergency.

Forecasts offer protection only when they prompt action. Heatwaves can be predicted about a week ahead, Prof Engelbrecht said, providing time to plan water provisioning and other services.

How climate hazards change disease risk

Prof Rees explained that changing rainfall, rising temperatures, and extreme weather events alter vector habitats and stress local water and sanitation systems, compounding risks for diseases like Ebola and cholera.

Understanding these risks requires looking beyond individual pathogens to ecosystems, animal hosts, human movement, humanitarian crises and political conditions. Many African countries face overlapping climate hazards, instability and epidemic risks. Integrating meteorological and environmental data into public-health planning can help authorities anticipate outbreaks.

She pointed out that climate change and infectious diseases interact in crucial ways. Many African countries are vulnerable to climate hazards, geopolitically unstable, and prone to epidemic diseases.

In recent decades, climate change has contributed to several epidemics. For example, climate events linked the 1993 hantavirus outbreak in the USA and the 1997 Rift Valley fever outbreak in East Africa. (The hantavirus outbreak followed increased rainfall during the 1992–1993 El Niño. The Rift Valley fever outbreak was driven by an extreme 1997–1998 El Niño/ Southern Oscillation event that caused heavy rainfall, flooding and a surge in mosquito populations.)

"In the 21st century, we are now really understanding that climate change and biodiversity loss and ecosystem disruption are influencing disease emergence," she said. While direct links between climate change and initial wildlife-to-human Ebola spillover are complex, environmental degradation and habitat shifts increase human-animal interactions.

Prof Rees identified four linked pathways through which climate hazards can alter infectious-disease risk on the continent. First, hazards can bring pathogens closer to people. Floods may contaminate water, and environmental changes can alter the distribution of disease-carrying mosquitoes and other vectors.

Second, hazards can bring people into closer contact with

pathogens. Displacement, changing livelihoods, and crowded temporary accommodation can create unfamiliar exposures. Third, environmental conditions can favour pathogen survival or transmission. Temperature influences mosquito survival, biting and the replication of viruses they carry; warmer aquatic environments can favour certain bacteria.

Fourth, disruption can weaken human defences. She pointed out that malnutrition, physiological stress, unsafe water and interrupted healthcare make infections more dangerous. A single flood can activate several pathways by damaging sanitation, contaminating supplies, displacing families and interrupting treatment.

Prof Rees described the recent Ebola outbreak in the Democratic Republic of the Congo as a "perfect storm": deforestation, mining, weak health services, poor surveillance and conflict combined to accelerate transmission. Climate pressures compound the social, political and economic conditions that allow epidemics to grow.

Climate-related hazards aggravate diseases

Climate change influences disease by altering interactions among pathogens, hosts, vectors, and the environment. Prof Rees cited research showing that one or more climate-related hazards have aggravated 58% of known human pathogenic diseases.

"In the future, we will face an extraordinary mix of warming, precipitation, floods, storms, and changes in ecosystems and ocean temperatures," she said. "This will directly affect vector-borne, waterborne, and airborne diseases."

The rise in global temperatures enables climate-sensitive disease vectors like mosquitoes and ticks to expand their ranges and reproduce faster, increasing their capacity to transmit diseases.

Prof Rees said mosquito-borne diseases are among those affected, as warmer conditions allow disease-carrying insects to move into new areas. Mosquitoes are the primary vectors for dengue, yellow fever, chikungunya, and Zika. Dengue fever has spread significantly in recent years, with nearly half the world population at risk. This expansion is driven by climate change, globalisation, population growth, and the spread of the ***Aedes*** mosquito.

Malaria transmission is shifting, increasing in areas where it was previously uncommon, including Europe, and declining where temperatures exceed optimal conditions. "Overall, we see a higher likelihood of outbreaks when favourable climate conditions coincide with urbanisation, travel, and weak vector control," she said.

"In Africa, we are seeing a new urban malaria mosquito-borne disease. ***Anopheles stephensi***, originally from South Asia and the Arabian Peninsula, has spread and is rapidly expanding across the Horn of Africa and into African cities." Researchers first detected it in Djibouti in 2012, and it has spread to six other countries.

Unlike many malaria vectors, it thrives in urban environments, breeding in water-storage containers and other artificial habitats. "We saw a similar pattern with the spread of Zika in Latin America, where urban environments and storage containers served as mosquito sources," Prof Rees said.

The mosquito transmits both ***Plasmodium falciparum*** and ***Plasmodium vivax***, adding another challenge to malaria control. She also highlighted rising insecticide resistance and diagnostic difficulties as rapid tests become unsuitable for some malaria infections being recorded.

Flooding creates a different but connected threat. Contaminated water can increase cholera and other diarrhoeal diseases, with particularly severe consequences for children under five. Cholera prevention is inseparable from reliable water and sanitation infrastructure.

Prof Rees noted a sevenfold increase in cholera cases in southern and eastern Africa in early 2026 compared with 2025. Thirteen African countries reported outbreaks, including Mozambique following catastrophic flooding. Floodwaters can simultaneously damage infrastructure and expose families to contaminated water.

The challenge is to connect surveillance and prevention across services that often respond separately: weather forecasting, water provision, sanitation, housing and healthcare. Their failures can reinforce one another, just as effective protection in one area can reduce pressure on another.

Preparing for more than one extreme summer

Major shifts in global health funding and mounting debt pressures threaten countries' ability to respond, Prof Rees warned. Many African countries spend more on loan interest than on health or education, limiting investment in services and pathogen surveillance.

Vaccines remain important, but large outbreaks create sudden demand. Reliable supplies, functioning sanitation and resilient infrastructure help prevent infections before emergency responses become necessary.

Roughly half the region's urban population lives in slums or informal settlements, where extreme heat, unsafe water and crowded conditions overlap. In these settings, preparedness must reach beyond issuing warnings.

This makes the quality of the response as important as the forecast. A week's warning of a heatwave creates an opportunity to organise supplies and services; it does not itself reduce exposure. Similarly, information about changing disease risks must translate into surveillance, prevention and access to care.

The season's El Niño lessons will include whether authorities identify the most exposed communities, keep essential services operating and act before hazards become health emergencies.

For households, the test is immediate: can they stay safe through another hot day, obtain clean water and reach healthcare when needed? For decision-makers, it is also cumulative: can systems withstand repeated shocks without leaving communities progressively less able to recover?

This year's El Niño is temporary, but its consequences may outlast the event. Failed harvests, damaged infrastructure and interrupted care can leave households and services less able to withstand the next shock.

The stress test will reveal whether warnings lead to protection, water keeps flowing, sanitation holds and healthcare reaches people in time – and where investment is needed before the next extreme event.