

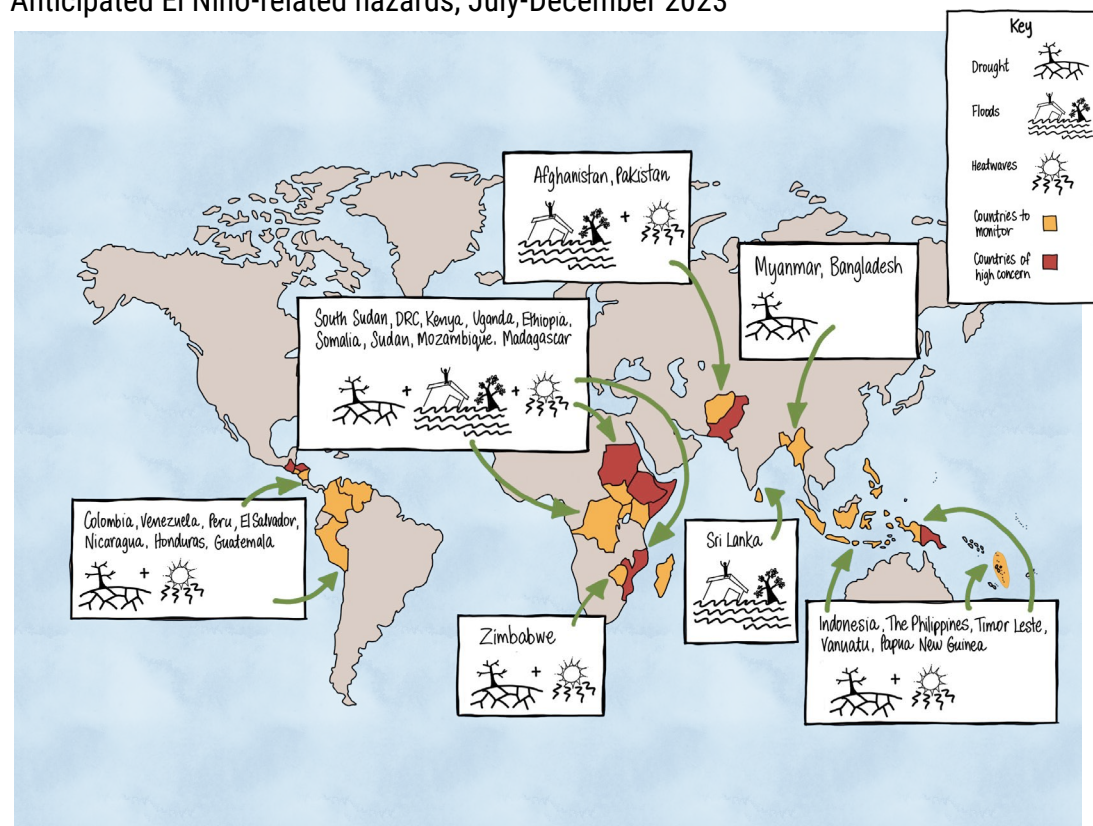
EL NIÑO OVERVIEW

Anticipated humanitarian impact in 2023

KEY MESSAGES

- An **El Niño season started in June 2023** and is forecast to persist until February 2024, with a high probability of displaying above-moderate strength.
- El Niño is expected to worsen **global warming**: the global temperature may **exceed 1.5° C** on multiple occasions between 2023–2024.
- As a result of El Niño, several countries already facing humanitarian crises may experience more severe and intense **heatwaves, wildfires, floods, droughts, and epidemics**. These events are likely to increase the humanitarian needs of the exposed populations, with **food security and health** expected to be the most affected dimensions.
- This El Niño season might also interact with other phenomena, such as the **Indian Ocean Dipole**, and **record-high above-average atmospheric and oceanic temperatures**, triggering unpredictable and potentially more extreme outcomes.
- Based on seasonal forecasts, in 2023, El Niño's impact is expected to be particularly severe in **Central America** (dry conditions), **northern South America** (dry conditions), **East Africa** (both dry and wet conditions), and **East Asia and the Pacific** (dry conditions).
- Countries at the highest risk of severe humanitarian impacts caused or worsened by El Niño from July–December 2023 are **Ethiopia, Guatemala, Honduras, Mozambique, Pakistan, Papua New Guinea, Somalia, and Sudan**. This prediction is based on seasonal forecasts and pre-existing crisis and vulnerability factors.

Anticipated El Niño-related hazards, July-December 2023



Source: ACAPS

See full map on page 20.

TABLE OF CONTENTS

What is El Niño-Southern Oscillation	3
2023–2024 El Niño Situation overview	3
Potential global impacts of 2023-2024 El Niño	4
Main anticipated humanitarian impacts in 2023	5
Regional impact outlook	6
Africa	6
Asia and the Pacific	12
Central and South America	16

About this report

Aim of the report: the start of an El Niño season was officially announced in June 2023. This report provides a global overview of its anticipated humanitarian impact between July–December 2023, aiming to support strategic planning and anticipatory action.

Methodology: this report is based on historical data covering the impact of previous El Niño events, seasonal climate forecasts, and sources from humanitarian organisations, think tanks, and local and international media. The analysis also builds on three ACAPS datasets: the *severity index*, *humanitarian access index*, and *seasonal calendar*.

Scope: the geographic scope of the report is global. The report does not provide exhaustive coverage of all countries exposed to El Niño, as it focuses on areas where seasonal forecasts and pre-existing vulnerability factors indicate a potential increase in humanitarian needs, particularly related to food security and health.

Limitations: the historical impact of previous El Niño events only indicates what can be expected. It is important to note that each El Niño-Southern Oscillation (ENSO) event is unique, and the effects observed in the past may not necessarily occur in the current El Niño, especially if it is of moderate strength or has a brief duration. The interaction between this El Niño, current record-high global warming, maritime heatwaves, and other interannual variability phenomena can lead to unexpected outcomes. The accuracy of climate forecasts, which provide valuable tools for anticipating the effects of El Niño in the coming months, typically decreases when the lead time exceeds three months. Due to this, beyond September 2023, the designation of “countries to monitor” and “countries of high concern” might change, and the reliability of the report’s anticipatory analysis is reduced.

WHAT IS EL NIÑO-SOUTHERN OSCILLATION

ENSO stands for El Niño and Southern Oscillation, with El Niño pertaining to a periodic fluctuation in sea surface temperature and Southern Oscillation to the changes in the air pressure of the overlying atmosphere across the equatorial Pacific Ocean (NCEI accessed 12/04/2023). The ENSO cycle is a natural climate phenomenon that results from complex interactions between the atmosphere and the ocean and has been active for thousands of years. Although many processes are involved in the global climate system, ENSO is one of the main drivers of interannual climate variability (Met Office accessed 13/04/2023).

The two extreme ENSO phases are El Niño and La Niña. El Niño occurs when the surface waters in the central and eastern Pacific Ocean become warmer than average, and La Niña occurs when these waters become cooler than average. These changes in sea-surface temperatures can cause shifts in atmospheric pressure and winds, leading to changes in rainfall patterns, temperature, and other weather-related phenomena worldwide (Met Office accessed 13/04/2023). El Niño and La Niña events usually develop during April–June and reach their maximum strength during October–February. They typically occur every two to seven years and can last several months to a few years (IRI accessed 13/04/2023). El Niño and La Niña can last more than a year, but this is rare for El Niño events. It is common for La Niña to last for two years or more (NOAA 18/01/2016).

ENSO and climate change: although the ENSO cycle is independent of climate change, the two are interrelated. Climate change can amplify the rainfall variability related to ENSO and increase the likelihood of extreme climate and weather events (IPCC 2021). Global warming is also increasing ENSO ‘variability’, and strong El Niño and La Niña events have occurred more frequently than the pre-1960 average. More frequent swings from a strong El Niño to a strong La Niña are anticipated in the future (Cai et al. 18/05/2023). Simultaneously, ENSO can increase global warming and worsen climate change. During an El Niño, the ocean transfers some excess heat and moisture to the atmosphere, and a strong El Niño can add up to 0.2° C to the Earth’s average temperature (Climate Central accessed 08/05/2023). Aside from its warming effect, El Niño can increase CO₂ levels in the atmosphere, which is the primary cause of global warming. During El Niño, the Amazon rainforest and other tropical forests in regions such as Africa, Australia, and India experience drier conditions, reducing vegetation growth and minimising the capacity of forests to absorb CO₂ from the atmosphere (Jones et al. 01/11/2001).

2023–2024 EL NIÑO SITUATION OVERVIEW

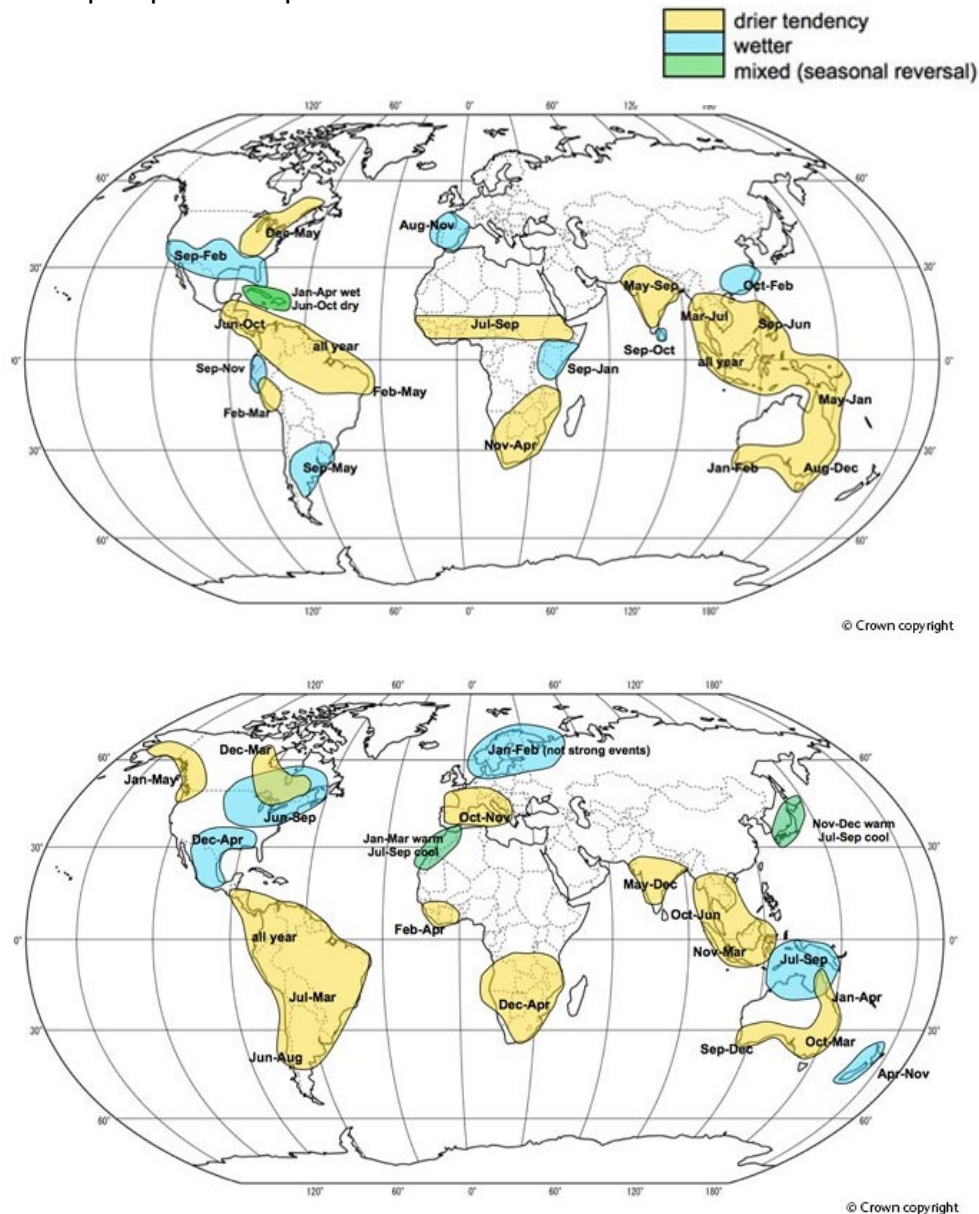
Since 2020, the Earth has experienced a prolonged La Niña phase, which ended in March 2023. Following a short neutral phase, an El Niño started on 8 June. While El Niño duration and intensity remain uncertain, models show that the event is more than 90% likely to persist until February 2024, with an 84% chance of exceeding moderate strength (CPC 13/07/2023). The most recent severe El Niño event started in May 2014 and ended in June 2016.

While El Niño is increasing its strength, there is documentation of the widespread warming of global oceans. During an El Niño event, the central and eastern Pacific Ocean experiences much warmer surface waters than other oceans. In June 2023, other oceans, including the northern Pacific and northern Atlantic Oceans, which typically do not warm up during El Niño, showed unusual temperatures for that time of the year. The interaction between this El Niño, the current record-high global warming and maritime heatwaves, and other interannual variability phenomena can lead to unexpected and potentially more extreme outcomes (NOAA 28/06/2023; Severe Weather Europe 07/06/2023).

Forecast models indicate that the next few months will see a ‘positive phase’ of the Indian Ocean Dipole, an interannual climate variability phenomenon occurring in the Indian Ocean. In the positive phase of the Indian Ocean Dipole, the western Indian Ocean becomes warmer. This event could strengthen the influence of El Niño in some regions, including drier-than-normal conditions in Southeast Asia, particularly in Indonesia, and above-normal precipitations during the ‘short rains’ season occurring from September–November in East Africa (BOM accessed 20/07/2023; Zhang et al. 20/10/2021).

The maps above provide a visual indication of El Niño’s historical impact on seasonal precipitation and temperatures. Each ENSO event is different and occurs in conjunction with other climatic events. Not all impacts occur in all ENSO events, and impacts may go beyond the regions indicated (Met Office accessed 31/05/2023).

El Niño precipitation impact



Source: Met Office (accessed 31/05/2023)

POTENTIAL GLOBAL IMPACTS OF 2023-2024 EL NIÑO

This year's El Niño will likely affect global environmental conditions (see following figure). Above-average temperatures, drier- and wetter-than-normal conditions, and warmer oceans will likely lead to several related hazards that affect humanitarian needs.

Heatwaves: the additional heat that El Niño generates is expected to push the global temperature temporarily past the 1.5° C threshold¹ on multiple occasions in 2023 and 2024, although the frequency, duration, and extent are unknown. The above-average temperatures will likely trigger more frequent and intense heatwaves in the coming months (Earth.org 18/01/2023; The Conversation 10/07/2023). Historical observations and climate models typically indicate above-average temperatures during El Niño years in tropical and subequatorial regions (Climate Central 08/02/2023).

Drought: above-average temperatures and drier-than-normal conditions resulting from El Niño are expected to trigger severe droughts, particularly in Central America, parts of East Africa, and East Asia and the Pacific. During El Niño in 2015–2016, southern Africa (particularly Lesotho, Madagascar, Malawi, Mozambique, Swaziland, and Zimbabwe), Central America (El Salvador, Guatemala, Honduras, and Nicaragua), Ethiopia, Haiti, Indonesia, Papua New Guinea, the Philippines, and Sudan experienced some of their worst droughts in decades, resulting in millions of people needing humanitarian assistance (WFP 28/01/2016; FAO 04/07/2016).

Hurricanes: El Niño usually enhances hurricane activity in the **central and eastern Pacific basins**, exposing the western coasts of Costa Rica, El Salvador, Guatemala, Honduras, Mexico, and Nicaragua to more frequent and intense hurricanes. Conversely, El Niño suppresses hurricane activity in the **Atlantic Basin**, reducing the frequency and intensity of hurricanes in the Caribbean Sea and the Gulf of Mexico (NOAA 30/05/2014; NOAA accessed 07/07/2023). In 2023, because of the exceptional warming of global oceans, some cyclone and hurricane seasons may not follow the patterns historically observed during El Niño.

Floods: by bringing heavy rainfall or dry spells followed by significant precipitation, El Niño increases the risk of flooding in some parts of the world. By the end of 2023, flood risk is anticipated in the coastal areas of East Africa. Eastern Ethiopia, northern Kenya, western Madagascar, northern Mozambique, Somalia, eastern Tanzania, and Yemen are some areas where floods have historically been higher than average during El Niño (Ward et al. 20/10/2014).

Disease outbreaks: El Niño increases temperatures and alters rainfall patterns, creating favourable environments for the survival of waterborne pathogens and infectious disease vectors such as mosquitoes. This situation worsens disease outbreaks and alters the spread

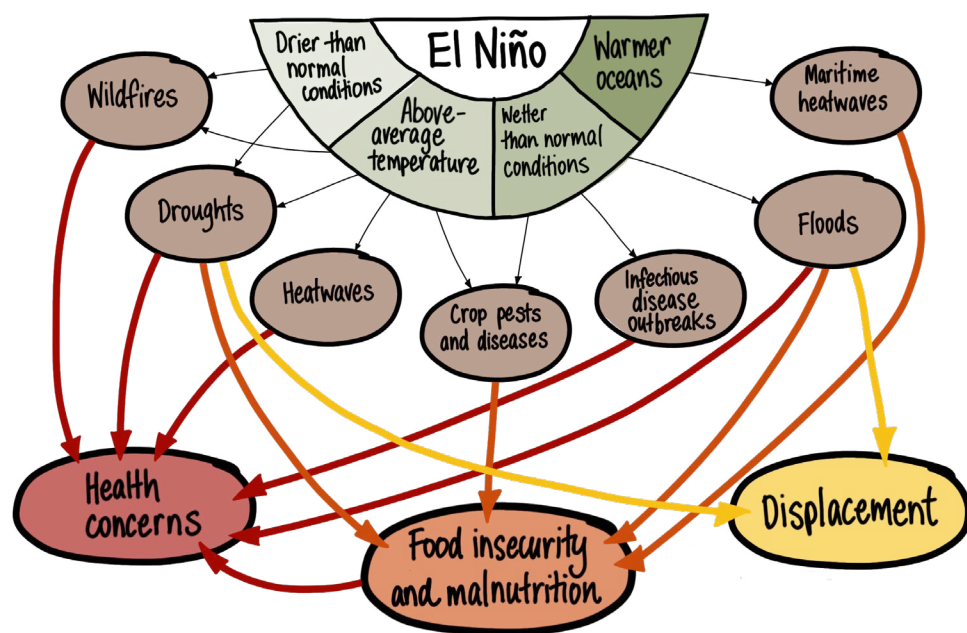
¹ The 1.5 global warming threshold refers to the target of limiting the global average temperature increase to 1.5 degrees Celsius above pre-industrial levels to limit the most severe impacts of climate change, such as extreme weather events, sea-level rise, biodiversity loss, and threats to human well-being, compared to higher temperature increases (Climate Feedback 24/05/2023).

of infections so that they may reach previously unaffected areas. Past El Niño events have contributed to an increase in malaria cases in Brazil, Colombia, and Venezuela, epidemics of dengue fever in the Pacific Islands, and cholera outbreaks in Bangladesh and South India, among others (WT 31/05/2023; The Conversation 26/01/2023).

Crop pests and disease: the increase in temperature and anomalies in rainfall patterns associated with El Niño can also increase the incidence of animal disease outbreaks, including zoonosis and food-borne diseases, plant pests, and fungal and bacterial diseases (FAO accessed 03/07/2023; Haile et al. 13/09/2021). El Niño may also trigger a surge in desert locust infestations in the southern Red Sea and the Horn of Africa, particularly in areas receiving above-average rainfall in November–December (FAO 20/10/2015).

Wildfires: during El Niño, fire-prone regions worldwide experience unusually warm and dry conditions, and wildfires become more frequent in some parts of the world. Studies based on observations from 2015–2016 identified a global total increase of 4% in burned areas during El Niño (Burton et al. 10/06/2020).

Global impacts of El Niño



Source: ACAPS

MAIN ANTICIPATED HUMANITARIAN IMPACTS IN 2023

Displacement: extreme weather events associated with El Niño will likely trigger displacement. Floods and wildfires may damage and destroy housing and key infrastructure, requiring people and communities to leave their homes. Disease outbreaks and reduced agricultural production in areas with lower-than-average rainfall or higher-than-average temperatures may also lead to population movements. Some of the countries where the potential impacts of El Niño on displacement raise high concerns for the upcoming months include Ethiopia, Guatemala, Honduras, Mozambique, and Sudan, which are already major displacement hotspots in 2023 (DRC 03/2023).

Food insecurity and malnutrition: reduced agricultural production, water scarcity, and decreased fish availability are likely to cause increased food insecurity and malnutrition in some countries. Countries where drier-than-average weather conditions affect the entire crop cycle are of particular concern, as water deficits could limit both plantings and yields, increasing the effect on final production. These countries are in southern Africa, Central America, southern areas of East Asia, and northern South America (FAO 26/04/2023). The impact of El Niño on marine ecosystems varies in severity depending on the intensity of the El Niño event and its geographical location within the Pacific Ocean (FAO 22/04/2020). El Niño usually decreases fish yields in certain regions of the world, especially along the western coasts of South America. El Niño also causes maritime heatwaves, which are periods of extremely warm ocean temperatures that can potentially disrupt ocean ecosystems and lead to increased mortality rates among fish populations (Ocean Conservancy 13/06/2023). Droughts triggered by El Niño are expected to affect water supply and sanitation and reduce water quality. This will increase the incidence of waterborne diseases, which are one of the main drivers of malnutrition (WMO 04/07/2023).

Health concerns: El Niño is likely to trigger extreme weather events, such as floods, droughts, storms, wildfires, and heatwaves, that will have far-reaching health effects, such as infectious disease outbreaks, malnutrition, respiratory diseases, heat stress disorders, injuries, and mental health disorders (WHO/WMO 06/2023; WHO 26/04/2016; WT 31/05/2023). Extreme heat and heatwaves are responsible for some of the deadliest disasters despite their tendency to be overlooked. In Bangladesh, heatwave days have seen up to a 20% rise in fatalities compared to normal days (IFRC et al. 10/2022). Heatwaves can lead to severe dehydration, acute cerebrovascular accidents, and blood clot formation, besides causing severe symptoms, such as heat exhaustion and heatstrokes. People with chronic diseases, older people, and children are at a higher risk (WHO accessed 09/06/2023). Extreme heat can also harm foetal development (LSHTM 08/12/2022). During heatwaves, suicide rates and the incidence of psychiatric disorders increase as well (WT 31/05/2023).

REGIONAL IMPACT OUTLOOK

This section provides a general overview of the anticipated impacts of El Niño at the regional and country levels, based on historical data, seasonal precipitation, and temperature forecasts. The analysis also considers countries' existing humanitarian crises and vulnerability factors. The 'countries to monitor' are those where the effects of El Niño may lead to negative outcomes or generate humanitarian needs. The 'countries of high concern' are the ones where the effects of El Niño are expected to be particularly severe or worsen major humanitarian crises.

Access the ACAPS Seasonal Calendar [here](#)

Africa

Regional overview

El Niño has historically brought above-normal rainfall across parts of **East Africa** between October–December and dry conditions elsewhere in the region, particularly in Sudan and Ethiopia. Floods and droughts associated with El Niño can worsen food insecurity and increase the incidence of waterborne diseases, such as cholera (WFP 05/2023; Moore et al. 10/04/2017). Seasonal rainfall and temperature forecasts seem to confirm historical trends, with above-average temperature expected in the entire region and below-average rainfall likely to continue at least until September in large parts of Ethiopia, western Kenya, South Sudan, Sudan, and Uganda (ICPAC accessed 20/07/2023). From September 2023, eastern Ethiopia, coastal areas of Kenya and Tanzania, and Somalia will likely receive above-normal rainfall, which may cause flooding in flood-prone areas (C3S accessed 10/07/2023; WMO accessed 10/07/2023). The positive phase of the Indian Ocean Dipole may intensify the effects of El Niño in the region towards the end of the year, increasing the risk of floods (ICPAC 17/07/2023).

During El Niño events, southern **West Africa** usually experiences below-normal rainfall during the July–September rainy season. Current seasonal rainfall forecasts do not confirm this historical trend, as they anticipate above-average precipitation in the entire region (C3S accessed 15/07/2023; WMO accessed 15/07/2023). Above-normal rainfall could benefit agriculture but also trigger flooding in flood-prone areas. Close monitoring is necessary as the combined effects of conflict, climate shocks, COVID-19, and high food prices have caused a severe food security crisis in the region. In the Sahel, 45,000 people will likely experience Catastrophe (IPC Phase 5) food insecurity, including 42,000 in Burkina and 2,500 in Mali (WFP 18/04/2023).

El Niño tends to bring below-normal rainfall in **southern Africa** during November–April, which can severely affect maize yields in Mozambique, South Africa, and Zimbabwe (CGIAR 26/06/2023; FS 30/05/2023). Available seasonal forecasts anticipate below-average precipitation in the next few months in Madagascar, Mozambique, South Africa and Zimbabwe. Close monitoring is necessary as seasonal rainfall outlooks may change in September, and more countries in the region may experience below-normal rainfall towards the end of the year (IRI accessed 10/07/2023; C3S accessed 10/07/2023).

The timeline below presents the main El Niño-induced hazards to which countries in the region may be exposed between July–December 2023, based on seasonal forecast.

COUNTRY	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Ethiopia	Drought/Heatwaves			Floods		
	Floods					
DRC	Drought/Heatwaves			Floods		
Kenya	Drought/Heatwaves				Floods	
Mozambique		Drought				
	Floods					
Somalia				Floods		
South Sudan	Drought/Heatwaves			Floods		
Sudan	Floods					
	Drought					
Uganda	Drought			Floods		
Zimbabwe					Drought/Heatwaves	

Countries to monitor

Democratic Republic of Congo: below-average precipitation is forecasted in the southern regions for July–September, but above-normal precipitation is expected across the entire country, particularly in the northern and central regions, starting from October towards the end of the year (IRI accessed 05/07/2023; C3S accessed 05/07/2023; WMO accessed 05/07/2023). Although such rains are normal during the typical rainy season, the country has experienced severe flooding, including during the last El Niño event in 2015 (Le Monde 07/05/2023; Al Jazeera 09/12/2015). As cholera is endemic in parts of the country, the rains increase the risk of epidemic disease spread. This context is particularly true in the north and east, where there is also armed conflict and a high number of overcrowded IDP camps with poor sanitary conditions (WHO 10/02/2023).

Kenya: western and northern Kenya expect warmer-than-normal temperatures and below-average rainfall between July–October (ICPAC accessed 05/07/2023; C3S accessed 05/07/2023; WMO accessed 05/07/2023). Since 2023, these regions have been facing an extended drought and currently have the highest food insecurity levels in the country (FEWS NET accessed 10/07/2023 a). The coastal regions should experience above-normal rainfall from October towards the end of the year (IRI accessed 05/07/2023; C3S accessed 05/07/2023; WMO accessed 05/07/2023). This forecast for above-normal rains is aligned with the typical short rainy season in those regions, but there is a risk of localised flooding (FEWS NET 12/2013).

Madagascar: in 2015 and 2016, El Niño caused prolonged drought conditions and crop failure, resulting in increased food insecurity that particularly affected the country's south (AGRA 03/2018; EURACTIV 28/06/2016). El Niño's effects in the country vary throughout the different historical occurrences, and some past events have been associated with excess rainfall (Rabeharisoa et al. 2013). Current seasonal forecasts anticipate below-average rainfall in parts of central Madagascar between July–September. Towards the end of the year, eastern parts of the country may receive above-average rainfall, potentially triggering flooding (IRI accessed 17/07/2023; C3S accessed 17/07/2023; WMO accessed 17/07/2023).

South Sudan: seasonal forecasts for June–September anticipate below-average rainfall and warmer-than-normal conditions across South Sudan (ICPAC accessed 17/07/2023; C3S accessed 17/07/2023). This situation could affect the main rainy season, which crops and agricultural production depend on (ACAPS 27/10/2022; ACAPS accessed 18/07/2023). As the majority of the country is already facing IPC 3 and IPC 4 acute food insecurity levels, the situation is likely to worsen (FEWS NET accessed 10/07/2023 b). The displaced population groups arriving in South Sudan fleeing the war in Sudan are particularly vulnerable to food insecurity (ACAPS 17/05/2023). For October–December, above-normal rains are likely in some regions of the country, particularly in the south and west (IRI accessed 11/07/2023; C3S accessed 11/07/2023; WMO accessed 11/07/2023). Some of these regions have historically been prone to flooding (ACAPS 27/10/2022).

Uganda: El Niño can bring heavy rains and flooding to the country (OCHA 18/12/2015). Seasonal forecasts anticipate dry conditions in central and northern areas until September and above-average precipitation between October–November across the entire country (ICPAC accessed 20/07/2023; WMO accessed 20/07/2023; C3S accessed 20/07/2023).

Zimbabwe: forecast models anticipate the possibility of below-average rainfall towards the end of 2023, particularly in the central and southern regions (C3S accessed 11/07/2023). Such forecasts would affect the region's planting seasons, increasing the possibility of hardened drought conditions and affecting the country's crop production, livestock, and food security (FEWS NET accessed 11/07/2023). This forecast would pattern with previous El Niño events in Zimbabwe (USAID 30/09/1997). In 2015–2016, an El Niño-driven drought affected most of Zimbabwe. Below-average rainfall during the usual growing season led to crop failure, increased food prices, and heightened levels of food insecurity throughout the country (EC 2016; AGRA 03/2018).

COUNTRIES OF HIGH CONCERN IN AFRICA

Ethiopia

Inform risk index: very high (7/10)

- **Exposure:** 7.3/10
- **Vulnerability:** 7.1/10
- **Lack of coping capacity:** 6.7/10

Humanitarian access index: very high access constraints (4/5)

Crisis severity index: high (4/4)

Previous impacts of El Niño

In Ethiopia, El Niño can lead to drier-than-normal conditions, mainly in the northwestern part of the country, affecting the Kiremt rainy season (June–September). Kiremt rains account for 50–80% of annual rainfall and are vital for producing over 80% of Ethiopia’s agricultural yield (CDKN 29/06/2017; Philip et al. 15/03/2018). In 2015, a strong El Niño contributed to one of the worst droughts in decades in northeastern and central Ethiopia, leading to the failure of 50–90% of Meher crops and drying up water sources. Water scarcity also resulted in livestock deaths and poor pasture health, affecting the livelihoods of pastoral and agropastoral communities in Afar and Somali regions (OXFAM 24/02/2016; UNICEF 31/05/2016).

Projected hazards for July–December 2023 and main exposed localities

Seasonal rainfall forecasts for June–September anticipate wetter-than-normal conditions in northwestern (Benishangul Gumuz and Amhara regions), southeastern (including parts of eastern Oromia, Southern Nations, Nationalities, and Peoples’ or SNNP region, and Somali), and western Ethiopia. Drier-than-normal conditions are likely between July–September in central (Amhara and Oromia), eastern (Afar and Amhara), northern (parts of Afar, Amhara, and Tigray), southwestern (SNNP), and western (Gambela) areas. These conditions could worsen the drought in other areas, with a probability of recording below-average, normal, or above-average rains. Between October–December, there is a high probability of above-average rainfall in eastern regions (ICPAC accessed 29/06/2023; C3S accessed 10/07/2023). There is a risk of flooding and flash floods in the adjacent lowlands. Areas receiving above-average rainfall in November and December may also experience a surge in desert locust infestations (FAO 20/10/2015).

Pre-existing crises and vulnerability factors

Conflict, internal displacement, and natural hazards, including disease outbreaks, recurrent floods, locust outbreaks, and consecutive droughts, have placed at least 25 million people in need of humanitarian assistance (OCHA 24/04/2023 and 20/06/2023). Agropastoral and pastoral livelihoods depend highly on seasonal rainfall known locally as Kiremt (June–September), which is the main rainy season, and Belg (February–May), the short rainy season (NUPI 29/06/2022). Since 2020, five consecutive failed or poor rainy seasons have resulted in a severe drought, affecting agropastoral and pastoralist communities (OCHA 14/06/2023 and 10/03/2023). Conflict-affected areas across the country, including in Amhara, Benishangul Gumuz, Oromia, and Tigray, face reduced agricultural productivity as farmers miss the planting or harvesting seasons and lack agricultural inputs (FEWS NET 05/2023 b). Unusual flooding during the Belg season, between February–April 2023, also caused deaths, displacement, crop and livestock losses, and the destruction of essential public services, such as hospitals and schools across Afar, Oromia, SNNP, and Somali regions (OCHA 15/05/2023). Repeated shocks have eroded the coping capacities of households, particularly in Oromia, Somali, and Tigray regions, and this may reduce how communities can respond to the potential impacts of El Niño. Negative coping mechanisms and strategies, such as consuming less food, child marriage, and family separation, are on the rise, particularly among these regions’ pastoralist communities (The Guardian 30/04/2022; VOA 12/05/2022; Gebre et al. 08/03/2021). The suspension of UN food aid in the country continues to pose concerns for the millions of people dependent on food assistance (TNH 22/06/2023).

Anticipated humanitarian impact

El Niño will likely worsen humanitarian needs in food security, WASH, health, and protection. Below-normal Kiremt rainfalls and above-normal temperature in crop-producing highlands (parts of Amhara, Oromia, and Tigray) may result in low crop yields (ICPAC accessed 05/07/2023). Dry conditions in pastoralist and agropastoral areas in northeastern, southeastern, and southern regions may further reduce available pastures and increase livestock mortality rates. This situation will likely reduce food availability and increase food prices, worsening food insecurity (FEWS NET 05/2023 b).

Areas receiving above-normal rainfall (parts of Oromia, SNNP, and Somali regions) may experience flooding, agricultural damage, and a higher incidence of waterborne and vector-borne diseases, such as cholera and malaria. Since August 2022, there have been reports of a cholera outbreak across Oromia, Sidama, SNNP, and Somali regions (OCHA 18/05/2023). Flooding may also damage and destroy houses and livelihoods, displacing affected communities and raising additional protection risks.

COUNTRIES OF HIGH CONCERN IN AFRICA

Somalia

Inform risk index: very high 8.7/10

- **Exposure:** 8.9/10
- **Vulnerability:** 8.6/10
- **Lack of coping capacity:** 8.6/10

Humanitarian access index: very high access constraints (4/5)

Crisis severity index: very high (4.7/5)

Previous impacts of El Niño

Previous El Niño events caused severe flooding and droughts in Somalia. In 1997–1998, El Niño caused intense flooding that killed about 2,000 people, displaced around 250,000, killed livestock, and destroyed stored harvests. In October 2015, heavy rainfall caused floods in south-central Somalia, affecting 145,000 people. In that same year, El Niño had the opposite effect in the north of the country, causing below-average rainfall and a harsh drought, particularly in Puntland and Somaliland, weakening livestock and reducing crop yields. As a result of the drought, over 220,000 people needed critical lifesaving assistance (USAID 08/05/2016; UN CERF 08/04/2016; Climate Centre 27/08/2015; FAO 05/02/1998; CARE 29/06/1998).

Projected hazards July–December 2023 and main exposed localities

Between July–September, above-average temperatures are likely in most parts of the country except the southern coastal areas and parts of the northwest. These higher temperatures could worsen the current drought (ICPAC accessed 10/07/2023). Between September–November, there is a high probability of wetter-than-normal conditions throughout the country (C3S accessed 10/07/2023; WMO accessed 10/07/2023). Above-average rainfall may increase the risk of flooding, particularly in areas that drought is currently affecting, where the soil has a weakened absorption capacity. Above-average rainfall in November and December may also trigger a surge in desert locust infestations (FAO 20/10/2015).

Pre-existing crises and vulnerability factors

Conflict and climate hazards continue to drive humanitarian needs in Somalia. Over eight million people currently require humanitarian assistance (OCHA 08/02/2023 b). The Somali Government's counter-insurgency operations against Al-Shabaab and tensions following clan disputes continue to cause insecurity and displacement (ACLED 21/04/2023; OCHA 16/02/2023). The prolonged drought, resulting from six consecutive failed rains, is causing population movement as households search for food, water, and livestock pasture (UNHCR/WB 27/06/2023). At the end of 2022, conflict, drought, and floods had displaced over 3.8 million people within Somalia and into neighbouring countries. The majority of IDPs live in Banadir, Galgaduud, Gedo, and Hiran regions (IOM 28/02/2023; IDMC accessed 20/07/2023; OCHA 08/02/2023 b and 16/02/2023). Projections suggested around 6.6 million people faced high levels of food insecurity (IPC 3 or worse) through June 2023, including around 1.8 million who were acutely malnourished. Increased food prices, conflict and insecurity, and the impact of prolonged drought were the causes (IPC 25/04/2023). Somalia depends on rain-fed agriculture, with the sector accounting for 75% of the GDP and representing 93% of total exports, mostly linked to livestock exports. This dependency makes the country increasingly vulnerable to the impacts of climate change and climatic shocks (WB 28/03/2018). Climate change and variability in Somalia are the main drivers of conflict, as communities compete for limited resources, worsening clan-based disputes (OCHA 08/02/2023 b).

Anticipated humanitarian impact

The effects of El Niño on October 2023's Deyr rainy season are likely to cause riverine and flash floods, leading to displacement and the loss of lives and livelihoods. Areas along Juba and Shabelle Rivers will likely experience the greatest impacts (FAO 08/07/2023). These impacts could affect around 1.2 million people. The loss of livestock and crop damage are anticipated, with about 1.5 million hectares of farmland along the Juba and Shabelle Rivers at risk of flooding. Floods in these areas could worsen food insecurity and affect households' coping capacities (FAO 07/07/2023). Some negative coping mechanisms already in use are reducing food and milk consumption and increasing borrowing to cover the high cost of food and water, building debt. These coping mechanisms will likely continue to cover food consumption gaps (IPC 25/04/2023; OCHA 08/02/2023 b). Above-average temperatures between July–September could worsen the current drought. Dry conditions may particularly affect crop development in central and southwestern regions, where there was little to no rain in June and soil moisture deficits were recorded. Food consumption deficits will likely persist if farmers cannot plant as floodwaters recede, as some households did not plant because of forecasted unpredictable seasonal rains and experiences from previous poor rainy seasons (WFP 26/06/2023). A severe water shortage is expected to persist in central Somalia because of insufficient rains, which could worsen the cholera outbreak (WFP 26/06/2023; WHO 10/07/2023).

COUNTRIES OF HIGH CONCERN IN AFRICA

Sudan

Inform risk index: very high (7.1/10)

- **Exposure:** 7.3/10
- **Vulnerability:** 7.2/10
- **Lack of coping capacity:** 6.7/10

Humanitarian access index: extreme access constraints (5/5)

Crisis severity index: very high (4.7/5)

Previous impacts of El Niño

Historically, El Niño has reduced rainfall and increased drought across Sudan during the main rainy season (June–September). Since the 1980s, six moderate to strong El Niño events have affected Sudan, in which rainfall shortages or droughts of different magnitudes have been reported: 1986–1987, 1991–1992, 1997–1998, 2002–2003, 2009–2010, and 2015–2016. In 2015, El Niño significantly affected the rainy season with delayed rains, below-average rainfall, and intermittent dry spells. These events caused reduced cultivation areas, delayed planting, poor pastures, and limited water availability for people and livestock. Gedaref, Kassala, North Darfur, and North Kordofan states experienced the most severe impact. Heavy rainfall in eastern parts of the country triggered floods that destroyed infrastructure and displaced communities (FAO et al. 22/02/2016; FEWS NET 12/2015).

Projected hazards for July–December 2023 and main exposed localities

Precipitation forecasts for June–September anticipate above-normal rainfall in northern North Darfur, parts of South Kordofan, and most of Blue Nile, Sennar, and White Nile states, increasing the risk of flooding in these areas. The same forecasts indicate a probability of below-normal rainfall in Darfur region and Aj Jazira, Gedaref, Kassala, Khartoum, North Kordofan, Red Sea, River Nile, and West Kordofan states (ICPAC accessed 12/07/2023). Above-average temperatures are likely across the country (IRI accessed 12/07/2023; ICPAC accessed 12/07/2023).

Pre-existing crises and vulnerability factors

Sudan's deepening humanitarian crisis continues amid economic turmoil and pre-existing conflicts in various states, with 24.7 million people in need as at May 2023 (OCHA accessed 20/07/2023). The conflict between the Sudanese Armed Forces and the Rapid Support Forces has affected most states and resulted in the deaths of at least 2,800 people. This conflict has displaced almost 2.8 million people, including 2.2 million inside the country and at least 600,000 into neighbouring countries (OCHA 04/07/2023). The destruction of hospitals and lack of medical supplies have also caused the collapse of the healthcare system. Because of insecurity and conflict, humanitarian responders are struggling to provide aid to the increasing number of people in need (OCHA 04/07/2023; Gavi 02/05/2023; Irish Times 02/07/2023). Rainfall is the primary water source for domestic, industrial, and agricultural uses, especially in areas away from the Nile and its tributaries. Dry spells and erratic rains have affected the country's food production, increasing food prices. In October 2022, prices were up to 300% higher than during the same period in 2021. This increase, together with conflict, high inflation for fuel and other commodities, floods, and persistent disease outbreaks, resulted in more than 11.7 million people across the country being food-insecure as at November 2022. Dry conditions have severely affected Blue Nile, Central Darfur, Sennar, West Darfur, and West Kordofan states. In November 2022, those areas had seen a 40% increase in the number of people facing IPC 3 or worse food insecurity from the previous year. The conflict has worsened the situation, resulting in supply shortages and the closure of shops and markets. As at 10 May, the conflict had caused food prices to increase by at least 60% (OCHA 07/11/2022; Al Jazeera 03/10/2023; Africanews 10/05/2023). As at 19 May, the conflict had increased food security needs by up to 580%, health needs by up to 100%, education needs by up to 420%, protection needs by up to 500%, shelter needs by up to 400%, and WASH needs by up to 1,700% across the country (OCHA accessed 20/07/2023).

Anticipated humanitarian impact

The anticipated above-average rainfall in the southern states will increase the water level of White Nile River, increasing the risk of flooding. This situation is likely to compound the IDP crisis, especially in White Nile state, which hosted the largest displaced population in the country (212,265) as at 19 May. Flooding will likely result in an increased spread of waterborne diseases among IDPs with limited access to clean water and assistance because humanitarian responders have limited access to IDP populations nationwide. Below-average rainfall in Darfur region and Aj Jazira, Gedaref, Kassala, Khartoum, North Kordofan, Red Sea, River Nile, and West Kordofan states, coupled with high temperatures, may affect crops and livestock. This situation would worsen the food security crisis in these areas (REACH 19/05/2023; ACAPS 21/06/2023).

| COUNTRIES OF HIGH CONCERN IN AFRICA

Mozambique

Inform risk index: very high (7.2/10)

- **Exposure:** 7.8/10
- **Vulnerability:** 7.8/10
- **Lack of coping capacity:** 6.2/10

Humanitarian access index: high access constraints (3/5)

Crisis severity index: high (3.5/5)

Previous impacts of El Niño

Usually, El Niño brings below-normal rains in southern Mozambique and above-normal rains in the north (Club of Mozambique 14/06/2023). In 2015–2016, a severe drought affected large parts of the country and caused floods in northern regions (FAO 26/04/2023). This drought led to a significant decrease in agricultural production and an increase in food insecurity, particularly in rural areas where agriculture is a main source of livelihood (FAO accessed 04/07/2023; CARE 28/01/2016; FEWS NET 03/07/2016). The drought also resulted in water shortages across many parts of the country, affecting safe drinking water supply and heightening the risk of waterborne diseases (RIASCO 13/10/2016). In August 2016, nearly two million people, including an estimated 87,000 pregnant and lactating women, needed humanitarian assistance. An increase in child marriage was also observed (CARE et al. 01/08/2016; CARE 08/08/2016).

Projected hazards for July–December 2023 and main exposed localities

The National Meteorological Institute has warned that El Niño may lead to a drought in southern and central Mozambique. This drought is likely to begin at the start of the rainy season in September–October, with the most significant impact anticipated between December 2023 and February 2024, coinciding with the peak of the rainy season (BNN 15/06/2023 and 14/06/2023). Available seasonal forecasts anticipate above-average precipitation in northern Mozambique during September–November, which may trigger floods towards the end of the year (C3S accessed 07/07/2023; FAO 26/04/2023; Club of Mozambique 14/06/2023). There is no indication of below-average rainfall in the rest of the country, but the situation requires close monitoring as rainfall forecasts may change in September (C3S accessed 07/07/2023).

Pre-existing crises and vulnerability factors

Mozambique experiences drought, cyclones, floods, and conflict. In 2023, two million people will need assistance in northern Mozambique because of the conflict that started in 2017 (USAID 15/06/2023; OCHA 12/05/2023 b; ACCORD 24/08/2021). As at March 2023, an estimated 3.1 million people were experiencing IPC 3 or worse levels of food insecurity (IPC 29/03/2023). In March 2023, floods and Tropical Cyclone Freddy significantly affected 966,200 acres of land, leading to large crop losses and affecting livelihoods. Over 70% of the population relies on agriculture as their primary source of income, and it serves as the main employment sector for 80% of the workforce (IFAD accessed 05/07/2023).

Anticipated humanitarian impact

In northern areas, potential flooding in September–November raises a risk of displacement, further cholera spreading, and increased humanitarian needs. Over 830,000 people are internally displaced by conflict in northern Mozambique and particularly vulnerable to extreme weather events and waterborne diseases (UNCHR 27/06/2023; IFRC 02/07/2023). In southern and central areas, El Niño may delay and reduce the 2023–2024 rains and affect the main planting season in some areas. This delay would affect people dependent on agricultural labour activities and result in a below-average 2024 harvest, particularly in areas northeast of Gaza province and west of Inhambane province known as the Southern Semi-Arid Cereals and Cattle Livelihood Zone. In the semi-arid areas of the southern and central regions, reduced rainfall is likely to increase the spread of fall armyworm, grasshoppers, stalk borer, leaf miner, and rodents (FEWS NET 30/06/2023; FS 30/05/2023; Macao News 16/06/2023).FS 30/05/2023; Macao News 16/06/2023).

Asia and the Pacific

Regional overview

In **South Asia**, El Niño is associated with below-normal precipitation and above-average temperature during the monsoon season in large parts of the region, particularly in the Indian subcontinent. Seasonal temperature forecasts confirm historical trends, with above-average temperatures expected in the entire region. Rainfall forecasts do not anticipate the region's typical rainfall patterns associated with El Niño. Predictions suggest that the monsoon season will bring normal levels of rainfall to most parts of South Asia, except specific localised areas (C3S accessed 10/07/2023; WMO et al. 27/04/2023; IRI accessed 12/07/2023). The Indian Ocean Dipole could be the reason for this, as it is anticipated to enter its positive phase in the upcoming months. This positive phase could bring sustained monsoon rains and counterbalance the typical effects of El Niño on the monsoon season (C3S accessed 10/07/2023; Cai et al. 20/08/2021; BOM accessed 12/07/2023).

In **Central Asia**, El Niño can bring high temperatures, heavy precipitation, and floods between January–April, particularly in Pakistan and Afghanistan (FAO 26/04/2023; OCHA 20/01/2019). Current projections suggest that temperatures in southern and central Asia will be higher than usual, and above-normal precipitation may be observed before the end of the year, heightening the risk of flooding (IRI accessed 12/07/2023; C3S accessed 10/07/2023).

El Niño is often associated with warm and dry conditions in western countries of the Pacific region, particularly Indonesia, Malaysia, and the Philippines, as well as in the central Pacific Islands, such as Fiji, Papua New Guinea, and Tonga (WMO accessed 22/06/2023; WHO 16/07/2015). Seasonal forecasts confirm this historical trend, and above-average temperatures and below-average rainfall are expected in large parts of the region, particularly Indonesia, Malaysia, and, from September, Papua New Guinea and the Philippines (C3S accessed 10/07/2023; IRI accessed 10/07/2023).

The following timeline presents the main El Niño-induced hazards to which countries in the region may be exposed between July–December 2023, based on seasonal forecast.

COUNTRY	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Afghanistan				Floods		
Bangladesh	Heatwaves					
Indonesia	Drought/Heatwaves					
Myanmar	Heatwaves					
Pakistan				Floods		
PNG			Drought/Heatwaves			
Philippines			Drought/Heatwaves			
Sri Lanka	Floods					
Timor Leste	Drought/Heatwaves					
Vanuatu	Drought/Heatwaves					

Countries to monitor

Afghanistan: the seasonal temperature forecast for July–September 2023 indicates a high likelihood of above-normal temperatures, especially in the southern and central provinces. This increase could worsen existing drought conditions despite expected near-normal precipitation levels (IRI accessed 10/07/2023; C3S accessed 10/07/2023). Between October–December, wetter-than-normal conditions are anticipated in most of the country (WMO accessed 10/07/2023; C3S accessed 10/07/2023). The rainfall could benefit agriculture, but there is also an increased possibility of floods and landslides. From January 2024 onwards, wet conditions may persist, as El Niño typically brings above-average rainfall across most of the country, particularly in the northern and northeastern provinces (IFRC 04/2021).

Bangladesh: El Niño is associated with above-average temperatures and below-average rainfall during the monsoon season, affecting rice production and increasing cholera incidence, particularly between August–November (Anannya 06/2018; Martinez et al. 02/03/2017). In May 2023, the irrigated dry-season boro rice harvest showed above-average prospects (EC 07/06/2023). The seasonal temperature forecast anticipates above-average temperatures until the end of the year (IRI accessed 04/07/2023). The seasonal rainfall forecast is mixed, with some models indicating a probability of below-normal precipitation for July–September and others anticipating dry conditions persisting towards the end of the year (WMO et al. 27/04/2023; C3S accessed 04/07/2023). As a result, aman rice yields, which would be harvested between November–January, could decrease (FAO 24/06/2022).

Indonesia: during El Niño years, rain, normally centred over the country and the far western Pacific, shifts eastward into the central Pacific. As a result, parts of Indonesia experience severe drought and wildfires (NASA 13/01/2016). Seasonal forecasts expect below-average precipitation across the country during the July–September season, with dry conditions expected until the end of the year (C3S accessed 08/06/2023; WMO accessed 04/07/2023). In June 2023, the harvest of wet season rice ended with good prospects, but the season for irrigated dry season rice started with drier-than-average conditions (EC accessed 04/07/2023). El Niño will worsen dry conditions, and a positive Indian Ocean Dipole may intensify these later in the year, triggering severe agricultural losses (Zhang et al. 20/10/2021; Reuters 06/06/2023).

Myanmar: historically, the country experiences dry conditions and decreased agricultural production during El Niño, particularly affecting poor rural households (WB 02/04/2019). Seasonal forecasts anticipate above-average temperature throughout the second half of 2023, but rainfall outlooks are unclear. Forecasts expect above-average precipitation in the southern and central regions between July–September, and some models anticipate below-average precipitation at the end of the year (C3S accessed 04/07/2023; WMO accessed 04/07/2023; IRI accessed 04/07/2023). In 2022, conflict, climate shocks, and economic crises triggered a decline in food production (FAO 10/2022). In May 2023, Tropical Cyclone Mocha destroyed homes, farmland, and livestock, leaving 1.6 million people needing humanitarian assistance in Chin, Kachin, Magway, Rakhine, and Sagaing states (UN 02/06/2023). Further shocks in 2023 would increase the country's humanitarian needs in the context of sustained access constraints.

Philippines: El Niño events increase the likelihood of below-normal rainfall and above-normal temperatures, which can trigger water scarcity, affect agriculture and fish production, and increase the risk of wildfires. El Niño can strengthen the southwest monsoon, possibly bringing above-normal rainfall to the western parts of the country (ADPC 2022; PNA 02/05/2023). In 2016, the country experienced the worst El Niño event in recent history, affecting more than 20,000 farmers in Mindanao only (Philstar 10/04/2023). While the monsoon season is likely to bring average and above-average rainfall in July and August, seasonal forecasts anticipate below-normal rainfall in large parts of central and southern Philippines starting between August–September, with dry conditions expected in most of the country from October onwards (PAGASA accessed 03/07/2023; C3S accessed 03/07/2023; WMO accessed 03/07/2023). Government officials expect a decrease in rice production, which may cause rice shortages (Philstar 10/04/2023). Dry conditions may particularly affect Mindanao, the agricultural breadbasket of the Philippines, which accounts for 40% of all agricultural production in the country. The region also hosts some of the country's poorest provinces (CGIAR et al. 06/2019; FAO 30/04/2015).

Sri Lanka: El Niño usually leads to weak monsoon conditions over the country (CFC 21/04/2023). Seasonal rainfall forecasts for July–September anticipate wetter-than-normal conditions in Sri Lanka, particularly in southern parts of the country. Above-average precipitation may continue through the end of the year, potentially triggering floods and a higher incidence of dengue fever (C3S accessed 04/07/2023; EC accessed 04/07/2023).

Timor Leste: previous El Niño events triggered delayed rains, below-average seasonal rainfall, and dry conditions across the country, affecting agriculture and livestock. In 2015–2016, the drought led to water and food shortages, causing crop failure and the death of 70,000 livestock (CARE et al. 17/06/2016; Climate Centre 06/06/2016). About 70% of the country's population relies on agriculture and is still feeling the impact of the 2022 floods. Between May–September 2023, more than 260,000 people are projected to face Crisis (IPC Phase 3) food insecurity (IPC 14/02/2023). Seasonal forecasts anticipate below-average rainfall for July–September, which may affect off-season rice planting and growing. Dry conditions are also likely to persist towards the end of the year, which may affect the main rice and maize seasons (C3S accessed 03/07/2023; IRI accessed 03/07/2023; FAO 07/07/2022).

Vanuatu: El Niño is associated with below-normal rainfall and warmer temperatures, resulting in dry conditions in the country (VMGD 05/2023). Seasonal forecasts anticipate below-average rainfall for July–September, with an increased probability for dry conditions between September–November (C3S accessed 03/07/2023). Vanuatu is still recovering from two Category 4 tropical cyclones, Judy and Kevin, which hit the island early in March 2023, affecting over 80% of the population (WFP 03/04/2023).

COUNTRIES OF HIGH CONCERN IN ASIA AND THE PACIFIC

Pakistan

Inform risk index: high (6.1/10)

- **Exposure:** 7.2/10
- **Vulnerability:** 5.8/10
- **Lack of coping capacity:** 5.4/10

Humanitarian access index: very high access constraints (4/5)

Crisis severity index: high (3.9/5)

Previous impacts of El Niño

During El Niño, monsoon rainfall patterns can vary, including below-average or delayed rain that can lead to drought. The weakened or delayed monsoon season can lead to intense and concentrated rainfall, triggering flash floods. El Niño also contributes to increased temperatures, which worsens heatwaves. During El Niño events, the variability in monsoon rainfall can influence the glacial melt rates in the Hindu Kush-Karakoram-Himalayan region. Changes in precipitation patterns, temperature, and glacial ice melt can affect the timing and quantity of water availability, which can have implications for agriculture, food, and water security in the country (ISSI 09/06/2023; PWP 30/04/2023; CASS 20/12/2021).

Projected hazards for July–December 2023 and main exposed localities

Seasonal forecasts anticipate above-average temperatures, particularly in southwestern provinces (IRI accessed 10/07/2023). Between October–December, above-average precipitation is expected in large parts of the country, which may increase the risk of flooding at the end of the year and in early 2024 (WMO accessed 10/07/2023; C3S accessed 10/07/2023).

Pre-existing crises and vulnerability factors

Conflict in some regions, recurrent natural disasters, and economic slowdown drive a severe humanitarian crisis in Pakistan. In 2022, the most severe floods in the country's history affected 33 million people, damaged and destroyed housing and critical infrastructure, and resulted in wide crop and livestock losses. Flooding also triggered a major surge of malaria, diarrhoeal diseases, and cholera in all affected districts (C3S/ECMWF 09/01/2023; OCHA 04/10/2022; WHO 18/04/2023). In 2023, 14.6 million people will require emergency food assistance, and severe acute malnutrition rates will be twice the average for the South Asian region (OCHA 12/05/2023 a). Food price inflation reached 48% in April 2023, showing that food prices have continued to rise and a food shortage has continued in 2023. The country's lower foreign reserves make it difficult to meet the increasing demand through imports (WFP 10/05/2023; FSIN 02/05/2023; CNBC 06/04/2023). Besides food insecurity and malnutrition, limited access to WASH and health services increases the risks of disease outbreaks related to weather extremes (EC accessed 06/07/2023; WB 06/10/2022; UNICEF 21/03/2023). The latest FAO-WFP hunger hotspots report classified Pakistan as an area of significant concern, predicting that 8.6 million individuals may face severe levels of acute food insecurity from June–November 2023 (OCHA 13/06/2023).

Anticipated humanitarian impact

New extreme weather events in 2023 may further affect food production, particularly if above-average rainfall triggers flooding and damages crops before the end of the millet, corn, and rice harvests. These harvests occur between the end of November and early December (USDA accessed 11/07/2023). During flooding, the spread of diseases might arise from poor WASH conditions and a lack of clean water. The 2022 flood destroyed more than 4.4 million acres of agricultural land, meaning that wheat and rice production is expected to be lower in 2023 regardless of the impact of El Niño (FSIN 02/05/2023). This situation will likely affect livelihoods, especially for farmers, food security levels, and the country's economy.

COUNTRIES OF HIGH CONCERN IN ASIA AND THE PACIFIC

Papua New Guinea

Inform risk index: high (5.9/10)

- **Exposure:** 5.1/10
- **Vulnerability:** 5.5/10
- **Lack of coping capacity:** 7.3/10

Humanitarian access index: low access constrains (1/5)

Crisis severity index: medium (2.5/5)

Previous impacts of El Niño

A severe drought during El Niño in 2015–2016 affected an estimated two million households, with more than 220,000 requiring humanitarian assistance. The El Niño-induced drought also triggered water shortages, a lack of proper sanitation, and an increased incidence of communicable diseases (UNCT PNG 09/08/2022).

Projected hazards for July–December 2023 and main exposed localities

Seasonal forecasts anticipate dry conditions towards the end of the year, with below-average rainfall expected from September (IRI accessed 05/07/2023; WMO accessed 06/07/2023).

Pre-existing crises and vulnerability factors

About 80% of the country's population is semidependent on rain-fed subsistence farming, and more than three-quarters of the food consumed in the country is locally grown. As a result, any disruption to household food production has an immediate, severe, and long-lasting impact on food security. The highlands, with approximately 2.2 million people in thousands of small and isolated villages, are more vulnerable to weather extremes (UNCT PNG 18/04/2016). In April 2023, a severe drought was already reported in several provinces, with dry conditions expected to worsen as the country enters its dry season (PNG DMT accessed 05/07/2023).

From May–July 2022, election-related and tribal violence in Highlands region affected nearly 236,000 people and displaced an estimated 156,000 (USAID accessed 06/07/2023). The security situation remains volatile in 2023, with other episodes of violence reported in April (PNG DMT 27/04/2023).

Anticipated humanitarian impact

Dry conditions between July–September may affect rice yields expected in September (USDA accessed 07/06/2023). Prolonged dry conditions in 2023 may also reduce access to livelihoods for rural households, where persistent dry spells and increasing seasonal variability may already have depleted coping mechanisms (ABC News 09/04/2023).

Central and South America

Regional overview

In **Central America** and northeastern **South America**, El Niño has historically brought drier and warmer-than-average conditions between June–October and above-average precipitation between September–May, particularly around coastal areas. In Central America, dry conditions between June–October can affect the main season maize and bean crops, which account for a significant percentage of the region’s food production.

In 2023, El Niño is expected to disrupt food production in large parts of Central America and northern South America, particularly in Central America’s **dry corridor**, which may have adverse effects on both economic performance and food security in the region (WFP 29/05/2023; FAO 26/04/2023).

The dry corridor spans **Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua**, where over ten million people live. Many of these people are small-scale farmers relying on basic grain cultivation for their livelihoods. This region is particularly susceptible to extreme weather conditions, characterised by prolonged droughts followed by heavy rainfall. These extreme weather conditions severely affect the wellbeing and food security of the local communities (FAO accessed 22/06/2023). Approximately 80% of small-scale producers live in poverty, and these challenging conditions lead to a high migration rate. Since 2022, severe dry conditions have depleted food reserves and water availability for pastures (La Prensa Latina 16/05/2023).

In May and June 2023, late rains and dry conditions at the beginning of the rainy season delayed maize planting (FEWS NET 05/2023 a; GEOGLAM Crop Monitor 06/07/2023). Seasonal forecasts for July–September anticipate below-average rainfall in northern Guatemala, large parts of Honduras, and Nicaragua. El Salvador will likely experience normal precipitation (WHO accessed 10/07/2023; C3S accessed 10/07/2023; IRI accessed 10/07/2023). The effects of drought on food production and security may trigger large population movements and increase migration from the dry corridor towards the US (El Español 14/05/2023).

El Niño tends to enhance hurricane activity in the central and eastern Pacific Basin, which may expose Costa Rica, El Salvador, Guatemala, Honduras, Mexico, and Nicaragua to more frequent and intense hurricanes before the end of the season in November (NOAA 30/05/2014; NOAA accessed 13/07/2023; NHC accessed 13/07/2023).

The following timeline presents the main El Niño-induced hazards to which countries in the region may be exposed between July–December 2023, based on seasonal forecast.

COUNTRY	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Colombia	Drought/Heatwaves					
El Salvador	Heatwaves					
Honduras	Drought/Heatwaves					
Guatemala	Drought/Heatwaves					
Nicaragua	Drought/Heatwaves					
Peru	Drought/Heatwaves					
Venezuela	Drought/Heatwaves					

Countries to monitor

Colombia: seasonal forecasts indicate below-normal rainfall between July–September across the country and above-average temperatures in southern areas. Dry conditions may persist in central and eastern regions during the October–December period (WMO accessed 06/07/2023; C3S accessed 06/07/2023; IRI accessed 06/07/2023). Dry conditions could affect rice and corn yields between July–September (USDA accessed 06/07/2023).

El Salvador: unlike the other countries in the dry corridor, seasonal forecasts do not anticipate below-average rainfall in 2023 (WMO accessed 06/07/2023; C3S accessed 06/07/2023). Above-normal temperatures may affect maize crop performances in areas already experiencing dry conditions, which frequent weather and climate shocks make vulnerable (IRI accessed 06/07/2023; USDA accessed 12/07/2023 a). Farmers began planting for the main maize season in June, with a one-month delay following dry conditions in May–June. The planted area will likely be below average, which may reduce maize yields even if there is near-normal rainfall from July (FAO 19/06/2023).

Nicaragua: El Niño tends to trigger extreme droughts in Nicaragua, affecting crops and livestock, damaging dry forest ecosystems, and increasing the likelihood of forest fires (Cambio Climático accessed 06/07/2023). These conditions usually most affect the 68 municipalities located in the dry corridor, which are mainly dependent on agriculture, as high temperatures and droughts affect agricultural processes (IP 05/06/2023; BBC 15/05/2019). The 1997–1998 and 2014–2015 El Niños had a particularly severe impact on the country, especially on agriculture. This impact also affected food security and livelihoods (IP 05/06/2023; CNN 25/05/2016). The rainy season started late and with low rainfall in May 2023 (CPC 13/07/2023; FEWS NET 05/2023 a). Most of the country is expected to receive below-normal rainfall during July–September 2023, with dry conditions likely to continue until October (WMO accessed 07/07/2023; C3S accessed 06/07/2023). Higher temperatures are expected in the next few months, particularly between October–December (IRI accessed 06/07/2023; INETER accessed 06/07/2023). The conditions are likely to most affect areas in Central zone, such as Boaco, central-south Managua, Masaya, Nueva Segovia, and Rivas, which are located in the country’s dry zone (INETER accessed 06/07/2023). In these areas, a reduced harvest would severely affect the livelihoods of households relying on small subsistence farming.

Peru: seasonal forecasts anticipate above-normal temperature and below-average rainfall between July–September across the country. Below-average rainfall may continue until December, particularly in eastern parts of the country (WMO accessed 06/07/2023; IRI accessed 06/07/2023). This situation may reduce main cereal yields and disrupt the 2024 planting cycle (USDA accessed 12/07/2023 b).

Venezuela: seasonal forecasts predict that the country will experience below-average rainfall and above-normal temperatures between July–September (C3S accessed 06/07/2023; IRI accessed 06/07/2023). Dry conditions will likely continue until the end of 2023 (WMO accessed 06/07/2023). These conditions may affect the main maize and secondary rice season yields, to be harvested between September–November. Reduced food production may fuel food price inflation and worsen the food security crisis, particularly affecting small-scale farmers who rely on agriculture for domestic consumption (USDA accessed 12/07/2023 c; FAO 2023).

COUNTRIES OF HIGH CONCERN IN CENTRAL AND SOUTH AMERICA

Guatemala

Inform risk index: high (5.1/10)

- **Exposure:** 4.1/10
- **Vulnerability:** 5.7/10
- **Lack of coping capacity:** 5.4/10

Humanitarian access index: low access constraints (1/5)

Crisis severity index: high (4/5)

Previous impacts of El Niño

El Niño severely affected Guatemala in 2015, 2016, and 2018. The most hit region was the dry corridor, which hosts more than 1.2 million people and covers almost 10% of the country across the departments of Baja Verapaz, Chiquimula, El Progreso, Guatemala, Jalapa, Jutiapa, Quiché, and Zacapa (MAGA 08/2010). In 2018, drought affected more than 292,000 families and triggered the loss of over 180,000 hectares of maize. This drought severely affected the food and nutrition security of rural households and the country's economy (OCHA 15/12/2018).

Projected hazards for July–December 2023 and main exposed localities

The local forecast for July indicates below-average rainfall and above-normal temperatures (INSIVUMEH 07/2023). Seasonal forecasts for July–September anticipate above-average temperatures across the country and below-normal rainfall in northern areas (WMO accessed 12/07/2023; IRI accessed 12/07/2023; C3S accessed 12/07/2023). This situation may trigger drought and heatwaves and increase the proliferation of dengue-transmitting mosquitoes. Fourteen departments in the country are on alert for dengue, including Baja Verapaz, Chiquimula, Escuintla, Izabal, Jalapa, Jutiapa, Petén, Quetzaltenango, Retalhuleu, Santa Rosa, Suchitepéquez, and Zacapa (CONRED 06/07/2023; Prensa Libre 25/05/2023).

Pre-existing crises and vulnerability factors

The country is still recovering from a prolonged rainy season in 2022 and Hurricane Julia in October 2022, which severely affected crops and staple food availability. In 2023, the start of the rainy season in May was delayed, and severe rainfall at the end of June affected more than 490,000 people (GEOGLAM Crop Monitor 06/07/2023; PAHO 07/07/2023). 59% of the population live in poverty, and inflation in Alta Verapaz, Baja Verapaz, Huehuetenango, and Quiché has reached 12%, affecting food access for communities on the dry corridor (WFP 31/03/2023; FEWS NET accessed 08/07/2023). Between March–May 2023, 3.5 million people experienced IPC 3 food insecurity (IPC/SICA 29/06/2023).

Almost 50,000 people from Haiti, Venezuela, and other countries cross Guatemala each month to reach Mexico or the US. Many sleep in the streets without shelter, making them vulnerable to heatwaves (France 24 07/02/2023; Prensa Libre 12/10/2022). The country is also going through a turbulent electoral period, with high sociopolitical tension levels and frequent protests and clashes. Guatemala's constitutional court provisionally suspended the election results of the first round held on 25 June, leaving the country's political stability in question (InSight Crime 04/07/2023; EE 06/07/2023).

Anticipated humanitarian impact

The forecast of high temperatures and below-average rainfall may affect the country's main crop cycle, reducing maize and bean yields. Below-average harvests may particularly affect the food security of subsistence farmers (FEWS NET 2023). Dry conditions may also cause water shortages and heatwaves, triggering health impacts and increasing the incidence of mosquito-borne diseases (INSIVUMEH 07/2023; Prensa Libre 22/05/2023; CZAPP 30/06/2023). During the lean season, the number of people experiencing high levels of acute food insecurity (IPC 3 or worse) will likely increase to 4.3 million (IPC 28/06/2023). If the performance of the Primera season is below normal, the number of people experiencing food insecurity may remain high following the September–October harvest, particularly in districts already presenting high poverty levels and dependency on small-scale farming.

COUNTRIES OF HIGH CONCERN IN CENTRAL AND SOUTH AMERICA

Honduras

Inform risk index: high (5.1/10)

- **Exposure:** 6.5/10
- **Vulnerability:** 5.7/10
- **Lack of coping capacity:** 6.1/10

Humanitarian access index: 2/5

Crisis severity index: high (3.6/5)

Previous impacts of El Niño

El Niño severely affected Honduras during 1982–1983, 1997–1998, and 2014–2015 (Cidbimena accessed 07/07/2023 a; Cidbimena accessed 07/07/2023 b; EFE Verde 22/08/2015). During these events, high temperatures and a lack of rainfall led to livestock deaths, crop losses, forest fires, and outbreaks of crop pests and diseases, such as dengue, zika, and chikungunya (FAO 14/09/2015; Cenaos accessed 07/07/2023). The most affected departments were Choluteca, southern Comayagua, El Paraíso, Francisco Mórzan, southern Intibucá, La Paz, southern Lempira, Ocotepeque, and Valle (Cenaos accessed 07/07/2023).

Projected hazards for July–December 2023 and main exposed localities

In July 2023, areas in central, northern, and southern Honduras are projected to receive below-average rainfall, particularly affecting Choluteca, southern Comayagua, eastern El Paraíso, southern Francisco Mórzan, and La Paz, where rainfall is likely to be between 40–80% of previous averages. In August, even less rainfall is forecast for these departments, with expected precipitation falling below 40% of the annual average (Cenaos 18/04/2023). Seasonal forecasts for August–October predict that central and northern Honduras are most likely to receive below-average rainfall (IRI accessed 07/07/2023; WMO accessed 07/07/2023).

Pre-existing crises and vulnerability factors

Climate and weather extremes, poverty, socioeconomic instability, and violence have caused high levels of humanitarian need in Honduras. For several years, the country has been intermittently experiencing periods of floods and droughts (Devex 16/11/2022). Almost 40% of the population depends on agriculture, and farming communities have not fully recovered from previous disasters, reducing their coping capacity (IFAD accessed 07/07/2023; ACT Alliance 27/09/2022). Nearly 60% of the population lives in poverty and at least 30% in extreme poverty (UN 02/02/2023). Two out of every ten children are chronically malnourished, and between December 2022 and February 2023, about 2.3 million people (23% of the entire population) were facing IPC 3 or Emergency (IPC Phase 4) food insecurity levels (OCHA 08/02/2023 a; IPC 26/05/2023 a). The country has yet to fully recover from the economic impact of COVID-19 and the increase in food prices resulting from the pandemic and rising international fertiliser prices (FES 07/2022; OCHA 08/02/2023 a). Year-on-year inflation at the end of 2022 was 9.8% (SWI 05/01/2023). Honduras has the highest rate of violence in Central America and one of the highest rates in the continent (InSight Crime 08/02/2023). Criminal violence displaced 247,000 people in the country between 2008–2022 (UNHCR 22/12/2022). Honduras also experiences high rates of gender-based violence and higher poverty rates among women than men. During disasters and climate shocks, women are more likely to be affected or to adopt negative coping mechanisms (UNHCR 22/09/2021; La Prensa 03/11/2022; ONU Mujeres 17/11/2021; CARE 11/11/2021).

Anticipated humanitarian impact

High temperatures and drought could lead to livestock deaths and the loss of staple grain crops and affect other livelihoods, such as fishing (LT 12/04/2023; El Heraldo 23/05/2023). The disruption to the agricultural sector could reduce food supply and increase food prices, affecting the poorest households (IPC 26/05/2023 b; El Economista 12/06/2023). This disruption may lead to the adoption of negative coping mechanisms and increase levels of food security and malnutrition. Between June–August 2023, an estimated 25% of the Honduran population will face IPC 3 or worse levels of food insecurity (IPC 26/05/2023 b). The anticipated impacts of El Niño could cause these figures to increase from September. The increased incidence of dengue and other vector-borne diseases associated with abnormally dry conditions in the country may severely affect health in the coming months.

Anticipated El Nino related-hazards, July-December 2023

Key

- Drought
- Floods
- Heatwaves
- Countries to monitor
- Countries of high concern

