WEST AFRICA SEASONAL OUTLOOK

July – September (JAS) 2024

Released 3rd July

HIGHLIGHTS

- **April to June (AMJ) Performance:** El Niño brought heatwaves from Feb-March in the Sahel, especially in Mali, Ghana and Nigeria. Abnormally dry conditions delayed and hampered the growing season. Conflict in the Sahel, malnutrition and many outbreaks (esp. northern Nigeria) affected the region.
- **July to September (JAS) Outlook:** Above-average rainfall is expected across the Sahelian band, especially in Niger and Chad, driven by the onset of the high rain phase of the W. African Monsoon. River flow will be at or above-average in most river basins. Risk of flooding is high, especially in eastern Chad along the Sudan border, where many displaced people are seeking refuge, and more are continuing to arrive. Above-average (+0.5 to +1ºC) temperatures are expected across the region, except for central Chad, south Niger, north Nigeria, eastern Mali and Burkina Faso, where temperatures will likely remain near-average.

APRIL - JUNE REVIEW

- **Extreme humid heat:** In mid-Feb, across the Sahel and coastal West Africa, temperatures reached extremely dangerous levels (Fig 1a); followed by another wave of extreme heat in March (over Ramadan), with warnings issued by met services in Ghana, Mali and Nigeria and many excess deaths reported, especially in Mali [IFRC]. These out-of-season events were influenced by the strong El Niño event and would not have occurred without anthropogenic climate change [WWA].

- **Flooding and rainfall:** There was below-average rainfall during AMJ in the Gulf of Guinea region, which led to abnormally dry conditions during a key growing season (Fig 1b). The dry ground increases the risk of subsequent floods with the onset of rains [NOAA/CPC].

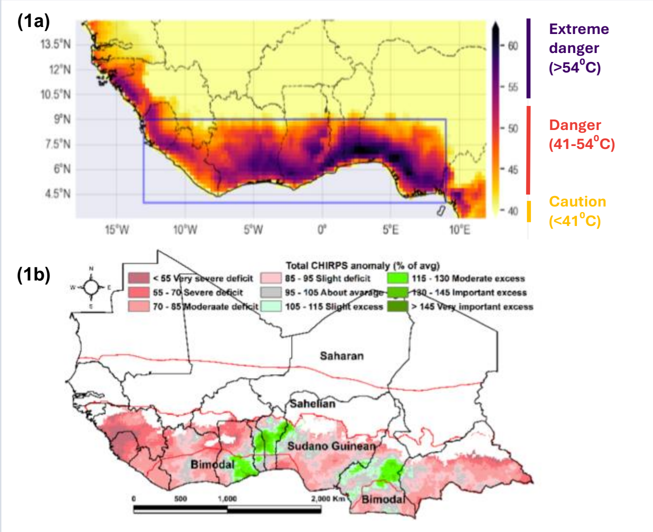

Fig 1a. Heat Index for 11-15th Feb '24 [ERA5]; **Fig 1b** Rainfall anomaly (% of avg) for Mar '24 [CHIRPS]

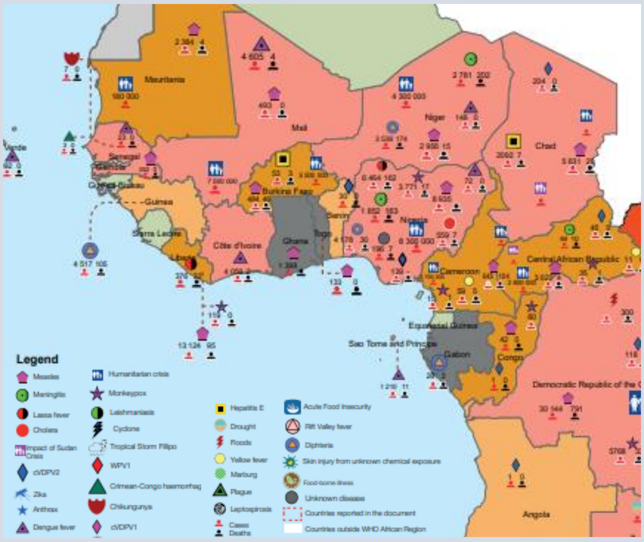

Fig 2. Disease outbreaks in W. Africa Jan'24-May'24 [WHO]

- **Outbreaks:** Over AMJ, outbreaks of meningitis (Nigeria, Niger), hepatitis E (Chad, Burkina Faso), Lassa Fever (Nigeria, Liberia), cholera (Nigeria), cVDPV1 (Chad, Benin), m-pox (Nigeria, Liberia) and measles, malaria and dengue have been region-wide. In north Nigeria, an unidentified disease occurred in April [Figure 2 WHO].

- **Food/agriculture:** In the northern part of West Africa, AMJ is the pastoral lean season, and generally livestock migration occurs from the South to the North. Here the agricultural lean season extends whilst cultivation is ongoing until the harvests in Aug/Sept. In the southern parts of West Africa, the lean season generally lasts from April into July, when the first maize harvest begins [FEWNET]. Staple food prices were significantly above 5-year averages across the region, driven by below-average supplies, strong demand, increased production and transportation costs, insecurity, sluggish macroeconomic conditions, and trade restrictions [FEWSNET].

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JULY TO SEPTEMBER CLIMATE OUTLOOK

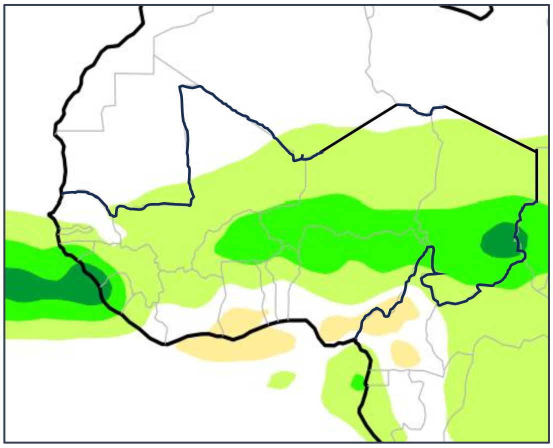

Fig 3. Rainfall anomalies over West Africa for JAS from [CS3[

- **The high rain phase of the monsoon (Jun-Aug), brings heavy rains to the Sahel,** following the onset phase (Mar-May) and preceding the southward retreat phase (Sep-Oct). After a year of dominance, El Niño has ended, returning to Neutral phase; but **La Niña is likely by fall – and usually brings wet conditions.**
- **Above average rainfall** is forecast across the Sahel during JAS with a high degree of certainty and agreement between models. However, the WMO does forecast below-average rainfall in isolated areas, including south Ghana to Southwest Nigeria. Below average rainfall is expected in the Gulf of Guinea region too [NOAA]
- JAS season historically brings relatively lower risk of extreme heat across the most of W. Africa, except for Chad, Niger and Mali which typically see their highest heat index (a combination of temperature & humidity) over JAS. Seasonal forecasts indicate **temperatures +0.5 to +1°C above average,** except for central Chad, south Niger, north Nigeria, eastern Mali and Burkina Faso, where temperatures will likely remain near-average.
- **Average/above-average river flows** are likely in most river basins towards the end of the season, except the Lower Niger, the Lower Volta, the Sassandra, and the Mono. This is highly likely in regions with above-average rainfall [CILSS].

JULY - SEPTEMBER HEALTH & NUTRITION OUTLOOK

- **Competing outbreaks** across the region place strain on the capacity to respond, with multiple simultaneous health challenges compounded by food insecurity, conflict, displacement, limited-resources and climatic changes all increasing the risk of unseasonal protracted outbreaks.
- **Water-borne disease** Chad is at high risk of flooding due to heavy-rains. Floodwaters increase the risk of cholera and other waterborne diseases (e.g. Hep E, >2,000 cases have already been reported in Chad). Historically, JAS rains bring the highest cholera outbreak risk in the Lake Chad basin, Nigeria and Niger [EMDAT]. The global cholera upsurge and vaccine shortages continue, highlighting an increased risk in 2024 compared to historic averages. Exposure to contaminated and polluted water from inundated industrial sites, sewage systems, and septic tanks also poses a significant health threat, and higher temperatures also increase the risk of AMR [McIver et al].
- **Vector-borne disease** Peak transmission of malaria is expected from July onward in the southern areas and August in the Sahel [PMI]. Widespread dengue outbreaks affected the region in 2023 [WHO] with Burkina Faso reporting 72% of all cases and 89% of all dengue deaths in the region from Jan'23-May'24. The timing and intensity of outbreaks will depend on temperature and rainfall; higher temps are likely to increase the risk of dengue in the region [Damtew et al]. West Africa has a high risk of zoonotic diseases and VHF outbreaks, amplified by climate change [Redding et al]. One model of Ebola spillover risk identified the transition from the dry to rainy season as a peak-risk period [Lee-Cruz et al].
- **Nutrition** Most areas remain in stressed/crisis food security levels, but IPC5 famine is unlikely. Prices remain high and are expected to increase over the end of the lean season due to depletion of household stocks and subsequent market dependence. Above average rainfall is favourable for growing conditions in JAS across the agricultural strip [FEWSNET]. Areas affected by conflict will remain in crisis: Northern Burkina Faso, Northern Chad, Northern Nigeria and Southeastern Mali, and will expand over JAS. Inland Sierra Leone is also likely to be in crisis [AGRHYMET].
- **Pests**: Fall armyworm (which first invaded W. Africa in 2016) continues spreading [Day et al] and will increase in the rainy season [Ahissou et al]. The summer Sahel rains will bring some adult locusts and small-scale breeding in Northern Mali, Niger and central/northeastern Chad [FAO].

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Calendar bars interpretation

50	100	150
1	10	20

Blue bars represent national avg (1994-2013) rainfall, from 0 to >150mm per dekad (10-days) [WFP]. Red bars represent the avg number of days/month above Heat Index >35°C, a measure of humid heat representing heat stress. We used projections for 2020-39 calculated for the optimistic socioeconomic emission scenario (SSP1-1.9) as it best-fits the current temperature increases seen regionally (+1 to 1.9°C) [CKP]. The avg HI>35°C was calculated for specific regions for each country, chosen based on where heat is most likely to impact MSF operations. Many countries have *highly variable* local rainfall and HI>35°. For more precise data we recommend [ERA5].

The mosquito symbol represents historical monthly malaria peaks [PMI, EMDAT, peer-reviewed studies]. N.b. Malaria is endemic in most of West Africa and outbreaks occur outside of these seasons, esp following atypical climatic patterns impacting vectors, and migration affecting community immunity. This could potentially *(with caution!)* be interpreted as a rough proxy for other mosquito-borne diseases but social, entomological and disease specific elements are relevant.

The contaminated water symbol signifies periods of high historical cholera risk. This could potentially *(with caution!)* also be used as a proxy for the risk of other bacterial waterborne disease outbreaks [Perez-Saez et al], but many other environmental and social factors alter outbreak risk. When different seasonal peaks exist across the country, different colours are used and referenced in the text accordingly.

The meningitis symbol represents months where historical meningitis outbreak risk is high [EMDAT and peer-reviewed literature]. This peaks in the dry season across the meningitis belt as Harmattan winds bring Saharan dust, which damages the mucosal barrier and inhibits immune defences, facilitating bacterial invasion – but outbreaks can occur year-round. Check ACMAD for meningitis/dust storm warnings and forecasts but these are infrequently updated [methods - Dione et al].

Rainfall	J	F	M	A	M	J	J	A	S	O	N	D
Chad1 HI35°												
Chad2 HI35°												

Chad

Climate: Above-average rains are forecasted for JAS, bringing a high risk of flooding during the monsoon season [IFRC]. Above-average temperatures are expected for the Sahara desert and the southern Sahel. Heat index >35° is shown above for Batha and Hadjer-Lamis (Chad1, high risk in JAS), and for Sila, Salamat, Wadi-Fira and Ouaddai (Chad2). **Health**: Along the Sudan border, heavy rains are likely to cause significant flooding, creating WASH issues as facilities are strained in IDP camps [Al-Shimari et al]. Over 5,000 measles cases had been reported in Chad (numbers from May), a severe Hepatitis E outbreak has been ongoing in Ouaddai province, with >2,000 cases [WHO] and a vaccination campaign is being considered [GAVI]. Since 2001, most cholera outbreaks that occurred in southern Chad began between June-Aug, but some occurred later from Sept-Nov, whereas in Lac, cholera outbreak risk has historically peaked in June/July and reduced in Aug [EMDAT]. However, some models show the national avg cholera outbreak risk peaks later in Aug-Oct [Perez-Saez et al]. Malaria is endemic, but outbreak risk peaks after the rainy season from Aug-Oct. Meningitis risk has a strong seasonality in Southern Chad; increasing in December and peaking in the dry season [EMDAT]. **Nutrition:** Food insecurity is being driven by population movements and market factors and is projected to worsen in central/southern areas. A severe and early pastoral lean period in MAM, resulting from poor access to water earlier in the year has put pressure on crops, water supply and pastoral livelihoods [FEWSNET]. Around 3.4M Chadians and refugees are projected to face severe food insecurity. Hunger has worsened from climate shocks, high food/fuel costs and the refugee crisis. Violent clashes are linked to hungry livestock damaging agricultural fields. **Pests**: Above average rains increase the risk of summer locust breeding, but no significant swarms are likely [FAO].

Rainfall	J	F	M	A	M	J	J	A	S	O	N	D
HI>35°												

Côte d'Ivoire

Climate: In Côte d'Ivoire, the wet season usually peaks in June. Torrential rain have recently affected Abidjan and surroundings, causing flooding and landslides, killing 8 people and cutting off many roads. [R-WEB]. The HI>35° shown for Cote d'Ivoire is for the Savanes, Lacs and Lagunes area. **Health**: There has been an outbreak of Dengue effecting >4,000 people [WHO]. Historically, cholera outbreak risk remains slightly higher than average during July-Nov [Perez-Saez et al]. Malaria is endemic, however peak transmission historically has occurred from April-June in the central, eastern and southern areas and from July-Sept in the northern area [PMI], and similarly dengue outbreaks occur mostly in the rainy season. Meningitis is endemic but outbreak risk historically peaks later in Jan-Feb [EMDAT]. **Nutrition**: Food insecurity may worsen over JAS due to below average rainfall during the growing season [FEWSNET]. **Pests**: Cotton-damaging pests [Kouadio et al], and Mealybugs affecting cocoa [Diallo et al] are spreading in C. d'Ivoire.

Rainfall	J	F	M	A	M	J	J	A	S	O	N	D
HI>35°												

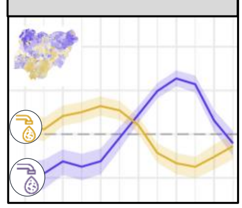
Bénin

Climate: The HI>35° shown for Benin represents the average of Couffo and Atakora, where MSF projects are located. Above-average rainfall is predicted in the north of Bénin. **Health**: Malaria is endemic but incidence peaks at different times in each region based on the rainy seasons [PMI]. Cholera outbreak risk historically increased steadily from Aug to peak around Oct [Perez-Saez et al]. **Nutrition**: Food insecurity levels are predicted to be IPC2 (stressed) in north/central areas [AGRHTMET] **Pests**: Fall armyworm is of particular threat to cassava and maize and is spreading in Benin [Winsou et al].

Rainfall	J	F	M	A	M	J	J	A	S	O	N	D
HI>35°												

Nigeria

Fig 5 Nigeria Cholera Outbreak Risk



Climate: The HI>35° shown for Nigeria is an avg for 8 northern states and Abuja, where the "heat season" mostly happens from April to June. Above-average rains are expected in the northern part of a country. **Health**: Outbreaks of measles, diphtheria, meningitis, monkeypox and cholera are ongoing in the north. Lassa outbreak risk previously peaked in the dry season, but now occurs year-round and the wet season presents a high-risk as well [Osho et al]. Lassa cases have been reported in Bauchi. An outbreak of an unknown disease occurred in Sokoto state in MAM affecting 200 and killing 7 [WHO]. Historical data illustrates two cholera outbreak seasonality patterns, with peaks in the north-east and north-west corners of the country (blue) in Sept, and in May in the south (gold) [Perez-Saez et al]. Malaria is endemic in Nigeria, but there is higher, more seasonal transmission in the north, peaking after the rains [Ozodiegwu et al and WHO]. Meningitis outbreaks historically occurred in the dry season [EMDAT]. In the south, measles outbreaks are more common in both the Savannah and humid forest zones in the dry season from Feb-April but outbreak risk reduces with the JAS rains [Omonijo et al].

Nutrition: Conflict means food prices are high and malnutrition is spiking in the north [MSF]. The lean season began early this May, leading to food gaps for many poor households that will continue to face Crisis (IPC3). Food security is projected to worsen over JAS due to late rains, especially in northern states e.g. Borno, Kaduna and Niger. **Pests:** High rainfall during JAS may encourage the infestation of maize by armyworms [Adunola et al].

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Rainfall	J	F	M	A	M	J	J	A	S	O	N	D
HI>35°												

Burkina Faso

Climate: Extreme heat that would not have occurred without anthropogenic climate change has been affecting Burkina Faso across AMJ with many deaths reported [WWA]. Temperatures should become more bearable over JAS. The HI>35° shown above for Burkina Faso is the national average. Above-average rainfall is predicted for JAS, especially in the east. **Health:** There's recently been a hep E outbreak in Kaya district in early June, and measles cases are now reducing after almost 10,000 cases reported in 2024 so far [WHO]. Historically, cholera outbreak risk has increased steadily over the JAS season to peak in October [Perez-Saez et al]. Malaria is endemic but incidence is highest in the south where rainfall is highest (lagging about 8-9 weeks post rainfall compared to the dryer north where cases peak about 15 weeks post-rainfall), and malaria outbreak risk historically peaks from Aug-Nov [Bationo et al]. Meningitis outbreaks can occur year-round but has a strong seasonality in Burkina Faso, peaking in the dry season from Jan-May [EMDAT]. Burkina Faso reported 72% of all cases and 89% of all dengue deaths in the African region over the last 18 months, and remains the country with the largest dengue burden, reporting 17 098 cases (52%) and 38 deaths (67%) in 2024 [WHO]. **Nutrition**: Food insecurity will be driven largely by conflict in the North, and although risk of famine is low due to previous above-average production, the JAS period, the lean season, will see large numbers of people in Emergency (Phase 4) across the North and Catastrophe (Phase 5) in the least accessible areas [FEWSNET]. **Pests**: Fall armyworms are more common in the rainy season peaking in Aug in Burkina Faso [Ahissou et al].

Rainfall	J	F	M	A	M	J	J	A	S	O	N	D
HI>35°												

Sierra Leone

Climate: Above average rainfall is expected for JAS, especially around Freetown for the upcoming rainy season, increasing the flood risk. The HI>35° shown above for Sierra Leone is the national average. **Health:** In Sierra Leone cholera outbreak risk has historically been highest from July-Oct [Perez-Saez et al]. Malaria is endemic with high transmission all year, with a peak during the rainy season [Lahuerta et al]. Lassa fever outbreaks can occur year-round but are more common in the dry season around March [Shaffer et al]. **Nutrition**: Sierra Leone is largely expected to be in crisis (IPC3) level food insecurity. Coastal states will be less severely affected but an important part of the population of inland states such as Fabala, Koinadugu, Bombali, Tonkolili, Bo and Kenema are also expected to be at IPC3 level [AGRHYMET]. **Pests**: No significant locust swarms are likely [FAO].

Rainfall	J	F	M	A	M	J	J	A	S	O	N	D
HI>35°												

Mali

Climate: There has been extreme heat across the Sahel and West Africa over the MAM period, with the highest recorded temperature in Mali at 48.5°C, causing a surge of >100 deaths in Bamako [IFRC]. The W. Africa Monsoon season will bring above-average rainfall this year starting around Aug in Mali, increasing the likelihood of flooding. The HI>35° shown above for Mali is an average for Timbuktu, Gao, Mopti and Ségou. **Health**: Cholera outbreak risk in Mali historically increases in July and August during the rainy season and decreases during Sept-Nov, with another shorter peak in Dec (likely related to water shortages) [Perez-Saez et al]. In the dry northern area of Mali, malaria transmission is low and is generally epidemic, with outbreak risk increasing from Aug-Oct and related to rainfall and other weather conditions [Cissoko et al]. However, malaria has much higher incidence and is endemic in the south of Mali, where outbreak risk peaks around June-July, whereas in the central-west area it peaks from Aug-Oct [Cissoko et al]. Meningitis outbreaks are possible all year round and are most common during the dry Jan-March season due to dust storms. >4,000 dengue cases have been reported since the start of 2024, with serotypes DENV1 and 3 currently circulating [WHO]. Measles outbreaks are also ongoing [WHO]. **Nutrition**: The ongoing pastoral lean season is being exacerbated by conflict. Ménaka is currently experiencing IPC4 Emergency level food insecurity, which is forecasted to continue in JAS and crisis levels will likely worsen in southern Gao, Tombouctou and Mopti, however these areas retain better access to markets and humanitarian assistance, resulting in relatively lower population displacement compared to Ménaka [FEWSNET]. **Pests**: Above average rains increase the risk of summer locust breeding in the Sahel, but no significant swarm developments are likely in Mali [FAO].

Rainfall	J	F	M	A	M	J	J	A	S	O	N	D
HI>35°												

Niger

Climate: Extreme heat has caused many excess deaths over the AMJ season [WWA]. The HI>35° shown is an average of Tillabéri, Dosso, and Niamey states. Above-normal rain is likely to start around July in Niger. **Health**: Outbreaks of diptheria, dengue, measles and meningitis are ongoing [WHO]. Cholera outbreak risk seasonality is distinctly variable by geography, where Niamey and Agadez historically see peak risk in April-June (gold), while Tahoua, Zinder and Diffa historically have high outbreak risk in Aug-Oct (blue) [Perez-Saez et al]. Malaria is endemic nationwide but has a strong seasonality in the south with a high transmission period from July-Nov, whilst in the north it is endemic but has unstable transmission, that peaks from Aug-Sept [Tchole et al]. Meningitis outbreaks peak in the dry season from Jan-March [EMDAT]. In Niamey, data from 1995-2004 shows there is a high seasonality of measles outbreaks, which historically peaks around March and declines with the onset of the rainy season [Ferrari et al]. Niger is also projected to be one of the highest risk countries in the world for new invasive venomous snake species due to climate change [Martinez et al]. **Nutrition:** Despite recent trade sanctions being lifted on Niger, cross-border trade restrictions remain a major challenge. The western states of Tillabéri and Tahoua are at the highest risk of IPC3 crisis level food insecurity, with the rest of the country likely to remain stressed. The sustained rise in food prices is accelerating due to depleted cereal reserves and a combination of agroclimatic, security, and sociopolitical factors [FEWSNET]. **Pests**: Above average rains increase the risk of summer locust breeding in the Sahel and low numbers of adults will appear in central pastures and the Tamesna Plains, but no significant swarm developments are likely in Niger [FAO].

Fig 3 Measles Outbreak Risk

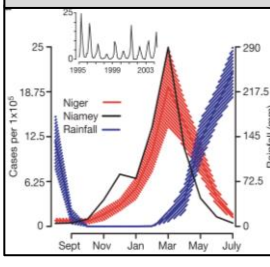
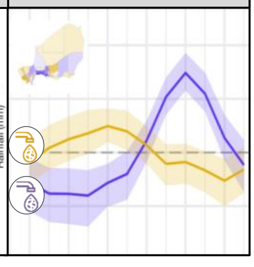


Fig 4 Cholera Outbreak Risk



DISCLAIMER: While climate forecasts can offer insights on health outcomes, other drivers (e.g. conflict, displacement, migration, socio-economics, politics and immunity and vaccination) modulate disease transmission and should always be considered. Furthermore, the impact of weather conditions may peak well after shifts in weather.