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El Niño 2026, Global Food Security, Economic Disruption, Conflict Risk, and Migration Implications.

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El Niño 2026: Global Food Security, Economic Disruption, Conflict Risk, and Migration Implications. A Joint Strategic Assessment.

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Abstract

A high-intensity El Niño event is confirmed as forming in the tropical Pacific as of June–July 2026. NOAA issued an El Niño Advisory on June 11, 2026; the World Meteorological Organization assigns El Niño probability at or above 90% for the second half of 2026; and the International Research Institute for Climate and Society (IRI) at Columbia University assigns 100% probability of El Niño conditions through at least November 2026, with subsurface ocean heat content at nearly double its equivalent June 2023 level. This joint strategic assessment, produced by the ISDO Economics & Social Affairs Department and Security & Intelligence Department, provides a comprehensive, evidence-based analysis of the cascading risks generated by this event across six interconnected domains: agricultural production and food security, global commodity markets and food prices, forced displacement and migration, conflict and state fragility, macroeconomic performance, and humanitarian response architecture.

The report documents that 52.8 million people in West Africa and the Sahel are already projected to face acute food insecurity (IPC Phase 3+) in the June–August 2026 lean season before El Niño reaches its peak; that Southern Africa, which suffered its worst drought in a century during the 2023–24 event (affecting approximately 68 million people), faces a renewed drier-than-normal 2026/27 rainy season beginning around October 2026; that the climate-conflict nexus in the Sahel is empirically grounded and operationally significant, with jihadist organizations documented to exploit resource scarcity for territorial control and recruitment; and that the global economy faces estimated cumulative losses in the range of $3–7 trillion over the event cycle.

Against the worst humanitarian financing backdrop in a decade — with the 2025 global appeal receiving only $12 billion — the report argues that the $202 million FAO/WFP Joint Anticipatory Action Appeal, which offers documented returns of up to $7 per $1 invested, represents the highest-return risk-reduction opportunity currently available in the global humanitarian system.

Keywords: El Niño; ENSO; food security; IPC; Sahel; Southern Africa; Horn of Africa; commodity markets; migration; conflict; anticipatory action; FAO; WFP; NOAA; WMO.

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Meteorological data: NOAA/Climate Prediction Center; WMO/Global Climate Observing System; IRI, Columbia University; ECMWF; Australian Bureau of Meteorology.

Food security and agricultural data: FAO — Agricultural Stress Index, GIEWS, Food Outlook, Food Price Index; WFP; FEWS NET (USAID); Cadre Harmonisé/CILSS; ICPAC/GHACOF; IPC Global Network.

Humanitarian and migration data: IOM Displacement Tracking Matrix; UNHCR; OCHA Financial Tracking Service.

Security and conflict analysis: Institute for Economics and Peace; ACLED; Tony Blair Institute for Global Change; UNODC.

Economic and financial analysis: Callahan and Mankin (2023, Science); Citigroup Global Perspectives & Solutions; World Bank; African Risk Capacity; Swiss Re Institute.

List of Abbreviations

Abbreviation	Full Term
ACLED	Armed Conflict Location and Event Data Project
AMIS	Agricultural Market Information System (G20)
ARC	African Risk Capacity
BOM	Australian Bureau of Meteorology
CERF	UN Central Emergency Response Fund
CH	Cadre Harmonisé
CPC	Climate Prediction Center (NOAA)
DTM	Displacement Tracking Matrix (IOM)
ECMWF	European Centre for Medium-Range Weather Forecasts
ENSO	El Niño-Southern Oscillation
FAO	Food and Agriculture Organization of the United Nations
FEWS NET	Famine Early Warning Systems Network
FPI	Food Price Index (FAO)
GHACOF	Greater Horn of Africa Climate Outlook Forum
GIEWS	Global Information and Early Warning System (FAO)
GTI	Global Terrorism Index (IEP)
ICPAC	IGAD Climate Prediction and Applications Centre
IEP	Institute for Economics and Peace
IMF	International Monetary Fund
IOM	International Organization for Migration
IPC	Integrated Food Security Phase Classification
IRI	International Research Institute for Climate and Society (Columbia)
IS-Sahel	Islamic State in the Greater Sahara
ISDO	International Sustainable Development Observatory
JNIM	Jamaa Nusrat ul-Islam wa al-Muslimin

Abbreviation	Full Term
LPA	Long-Period Average
NOAA	National Oceanic and Atmospheric Administration
OCHA	Office for the Coordination of Humanitarian Affairs
ONI	Oceanic Niño Index
SAPP	Southern African Power Pool
SST	Sea Surface Temperature
UNHCR	United Nations High Commissioner for Refugees
WFP	World Food Programme
WMO	World Meteorological Organization

Executive Summary

CRITICAL WINDOW

The policy window for effective anticipatory action in the 2026 El Niño cycle runs from June to September 2026.

After September 2026, the meteorological event will have achieved sufficient intensity that the costs of inadequate preparation will begin to materialize as production losses, price spikes, displacement surges, and, in the worst-affected regions, conflict escalation.

Every dollar invested in anticipatory action before this window closes returns up to $7 in avoided losses (FAO, 2025; Bailey & Harvey, 2017, World Development).

The Event

A high-intensity El Niño is confirmed as forming in the tropical Pacific as of June–July 2026, following the decay of the 2025–26 La Niña and a rapid boreal-spring warming of sea surface temperatures (SSTs) in the central and eastern equatorial Pacific. The National Oceanic and Atmospheric Administration (NOAA) issued a formal El Niño Advisory on June 11, 2026. The World Meteorological Organization (WMO) May 2026 Update assigned El Niño probability at approximately 80% for the July–August period, rising to or above 90% thereafter. The International Research Institute for Climate and Society (IRI) at Columbia University assigned 100% probability of El Niño conditions through September–November 2026, with 13 of 24 dynamical models projecting a "very strong" event (Niño 3.4 ≥ +2.0°C) at peak.

The weekly Niño 3.4 SST anomaly reached +1.7°C by mid-June 2026, up from +0.48°C in the March–May three-month mean. Upper-300m ocean heat content in the central and eastern equatorial Pacific was reported by IRI as nearly double its equivalent June 2023 level, a thermal reservoir diagnostic that historically predicts continued surface warming. NOAA's Climate Prediction Center assigns a 63% probability of a "very strong" event (peak Niño 3.4 ≥ +2.0°C), comparable to the 1997–98 "super El Niño."

The Stakes: Seven Key Findings

1. 52.8 million people already face acute food insecurity (IPC Phase 3+) in West Africa and the Sahel in the June–August 2026 lean season (the highest figure ever recorded in the region) before El Niño has reached its peak. A below-normal June–August 2026 West African Monsoon would damage the 2026/27 harvest and extend this emergency into a third consecutive year of near-record need.
2. Southern Africa, which suffered its worst drought in a century during the 2023–24 El Niño event (affecting approximately 68 million people and forcing six national disaster declarations), is expected to face a renewed drier-than-normal 2026/27 rainy season beginning around October 2026. The Kariba Dam, which fell to 7.7% of usable storage capacity in September 2024 (forcing daily load-shedding of up to 21 hours in Zambia) has not fully recharged, leaving the hydropower sector vulnerable to a second consecutive drought year.
3. Global food markets are currently well-supplied (FAO Food Price Index: 130.3 in June 2026, 18.4% below its March 2022 peak) but exposed to material tail risks. A realized strong El Niño could cut rice output by 20–50% in exposed regions of South Asia, Southern Africa, and Southeast Asia (World Bank, 2026 Commodity Markets Outlook). The 2023 India rice export ban precedent, which lifted Indica benchmark prices by up to 40%, demonstrates the amplification potential of unilateral trade policy responses.

4. The probability of new civil conflict onset in the tropics approximately doubles in El Niño years, from roughly 3% to 6% (Hsiang, Meng & Cane, 2011, Nature). In the Sahel, this statistical association has an operational correlate: JNIM and IS-Sahel are documented to exploit drought, water infrastructure control, and food provision as mechanisms for territorial influence, financing, and recruitment. The Tony Blair Institute for Global Change documented a 40% increase in the deliberate destruction of water infrastructure by armed groups in the Sahel between 2019 and 2024.
5. Drought-induced displacement is accelerating. IOM's Displacement Tracking Matrix recorded a 22% year-on-year increase in drought-related displacement in Somalia in early 2026, with drought accounting for three of every four new displacements. The Sahel-to-Mediterranean, Horn-to-Gulf, and Central America-to-US migration corridors are all exposed to compounding climate-conflict-hunger dynamics that will intensify as the El Niño deepens.
6. Economic costs are measured in trillions. Callahan and Mankin (2023, Science) attributed $4.1 trillion and $5.7 trillion in cumulative global income losses to the 1982–83 and 1997–98 events. Citigroup's 2026 assessment projects a base case of $3–5 trillion in losses over five years, rising to $7 trillion under a super El Niño scenario. At the national level, most-affected economies could see GDP reduced by up to 1.7 percentage points (FAO/Anticipation Hub, 2024).
7. The response architecture exists but is in practice underfunded. The 2025 global humanitarian appeal received only $12 billion, the lowest in ten years. FAO and WFP have launched their first-ever Joint Anticipatory Action Appeal, seeking $202 million to protect 8.8 million people across 22 high-risk countries. This appeal delivers up to $7 in avoided losses per $1 invested. Full funding of this appeal is the single highest-return intervention available in the current policy environment.

Priority Recommendations

THREE IMMEDIATE PRIORITIES (BEFORE SEPTEMBER 2026)

1. **FUND**: Fully fund the $202M FAO/WFP Joint Anticipatory Action Appeal by end-August 2026. Every week of delay reduces the window for trigger-based agricultural, livestock, and social protection activities.

2. **INSURE**: Pre-position sovereign parametric risk insurance (ARC and equivalents) for all high-risk Southern African states before the October 2026 season. Zimbabwe's $31.8M ARC payout in 2024 demonstrated week-not-month disbursement speed.

3. **COORDINATE**: Secure G20 standstill commitments against staple food export restrictions before December 2026 to prevent a repeat of the 2023 price contagion episode.

CHAPTER 1

1. Introduction, Scope, and Methodology

1.1 Background and Rationale

The El Niño-Southern Oscillation (ENSO) is the most consequential source of interannual climate variability on Earth. In its warm phase (El Niño), it shifts global precipitation and temperature patterns in ways that simultaneously affect agricultural production across multiple continents, commodity prices in globally integrated markets, human mobility patterns in fragile regions, and the resource pressures that interact with governance failures and violent conflict. No other single climatic phenomenon generates comparable and simultaneous shocks across food, migration, security, and economic systems.

El Niño events have historically been among the most foreseeable large-scale humanitarian risks. Modern ENSO forecasting systems, anchored by NOAA's Climate Prediction Center, WMO's Global Framework for Climate Services, and the IRI at Columbia University, provide probabilistic outlooks at four-to-eight-month lead time with demonstrably useful skill. The fundamental knowledge infrastructure for anticipatory action has existed since the 1990s (Barnston et al., 1999, Weather and Forecasting). Yet the humanitarian system has consistently struggled to translate that knowledge into timely, adequately resourced action before shocks materialize.

This report is produced in the window between the confirmed onset of El Niño (NOAA Advisory, June 11, 2026) and the expected peak of the event (September–December 2026). It is designed to serve three simultaneous purposes:

- To provide the most current, evidence-based assessment of the El Niño 2026 event and its cascading risks, grounded in the primary data and institutional analysis available as of early July 2026;
- To translate that assessment into specific, actionable, and time-bound policy recommendations calibrated to the actors and institutions best positioned to respond; and
- To contribute to the institutional knowledge base on El Niño impact assessment by making the analytical methodology (the sources, assumptions, and uncertainty estimates) explicit and reproducible.

It is produced by ISDO's Economics & Social Affairs Department and Security & Intelligence Department jointly, reflecting a deliberate analytical decision: the cascading effects of El Niño cannot be adequately analyzed or responded to within a single disciplinary or sectoral framework. Food security without attention to migration produces incomplete analysis of vulnerability. Migration without attention to conflict misses the most important threat multiplier in El Niño's impact chain. Economic analysis without attention to humanitarian system capacity underestimates the institutional constraints on response. This report attempts a genuinely integrated analysis.

1.2 Research Questions

The analysis in this report is organized around six primary research questions:

1. How intense and how long will the 2026 El Niño be, and how does it compare to prior events? (Chapter 2)
2. In which regions will the 2026 El Niño produce the most severe agricultural and food security consequences, for which populations, and on what timelines? (Chapter 3)
3. What are the expected effects of the 2026 El Niño on global food commodity markets, with what price and supply-chain implications? (Chapter 4)
4. How will the 2026 El Niño affect forced displacement and migration dynamics, with what implications for receiving communities and states? (Chapter 5)
5. What are the El Niño's implications for armed conflict and state fragility, particularly in the Sahel, the Horn of Africa, and other high-risk convergence zones? (Chapter 6)

6. What are the expected macroeconomic and sectoral consequences of the 2026 event, and what institutional mechanisms exist (and remain underfunded) for anticipatory response? (Chapters 7–8)

1.3 Analytical Framework: The ISDO Multi-Domain Risk Assessment Model

This report applies ISDO's Multi-Domain Risk Assessment (MDRA) model, which organizes the analysis of complex climate-humanitarian events around four analytical dimensions:

- **Exposure:** Which populations, agricultural systems, and economies are directly exposed to El Niño teleconnections, as defined by regional climate science and historical event analysis?
- **Vulnerability:** Among those exposed, which are most vulnerable based on pre-existing food security status, conflict exposure, institutional capacity, and economic fragility?
- **Cascading effects:** How do the direct impacts in the first domain (agricultural and climate) cascade into secondary (economic, humanitarian) and tertiary (migration, conflict) effects, and through what mechanisms?
- **Response adequacy:** What response mechanisms exist, what is their proven effectiveness, what is their current funding status, and what is the gap between funded and required response capacity?

The MDRA framework explicitly rejects a single-domain analytical approach in which food security, migration, conflict, and economics are treated as separate categories. It treats them as nodes in an interconnected system, where interventions in one domain (for example, anticipatory food security assistance) have measurable effects in other domains (for example, conflict prevention through reduced resource competition and jihadist recruitment opportunity). This systems perspective is the primary analytical contribution of the integrated multi-departmental approach.

1.4 Data Sources, Quality, and Limitations

This assessment draws on primary data and institutional analysis from five categories of sources. Each category is accompanied by a quality assessment and a statement of the limitations relevant to the claims built on that source:

1.4.1 Meteorological and Climate Forecasting Sources

Primary sources: WMO El Niño/La Niña Updates (monthly; May 2026 used as most current at time of writing); NOAA/CPC Monthly ENSO Diagnostic Discussion and El Niño Advisories; IRI ENSO Forecast probability tables (June 2026); ECMWF extended-range ensemble output; Australian Bureau of Meteorology ENSO Outlook and weekly SST data; ICPAC/GHACOF seasonal climate outlooks for the Greater Horn of Africa.

Quality assessment: High. These are the authoritative operational centers whose forecasts carry formal policy implications and whose methodologies are transparent, peer-reviewed, and subject to ongoing verification. IRI's probability tables are updated monthly based on multi-model ensemble consensus and represent the global scientific consensus.

Limitations: The "spring predictability barrier" (boreal March–May) limits forecast accuracy during the critical onset period; forecasts made after June carry higher confidence than those from earlier in the year. The warming background climate complicates the use of historical ENSO analogues (ECMWF introduced its "Relative Niño" index specifically to address this issue in June 2026). Peak intensity estimates carry wider uncertainty ranges than onset timing.

1.4.2 Food Security and Agricultural Data

Primary sources: FAO Agricultural Stress Index (ASI); FAO Food Outlook (biannual, June 2026); FAO Food Price Index (monthly, June 2026); FEWS NET country-specific reports (monthly or bimonthly, June 2026); Cadre Harmonisé analysis (late 2025, early 2026); ICPAC/GHACOF Greater Horn of Africa Climate Outlook Forum (May 2026); IPC Global Network country analyses; USDA World Agricultural Supply and Demand Estimates; South African Weather Service (SAWS) seasonal outlook.

Quality assessment: High for the IPC/Cadre Harmonisé analyses in the Sahel and Horn, which are the result of coordinated multi-agency field assessment processes with standardized methodology. More variable for the FEWS NET projections, which are explicitly forward-looking (8–12 months) and therefore subject to greater uncertainty.

Limitations: IPC Phase classifications are produced at sub-national scale but averaged to national figures in this report; this may mask acute sub-national pockets of more severe conditions. Cadre Harmonisé data is produced for West African states only; the Horn and Southern Africa use different assessment frameworks (IPC, VAC/MUFAN) that are broadly comparable but not identical. IPC projection periods extend 6–8 months ahead; El Niño impacts on the 2026/27 season will not be captured in IPC projections published before October 2026.

1.4.3 Humanitarian, Displacement, and Migration Data

Primary sources: IOM Displacement Tracking Matrix (DTM), Somalia quarterly displacement reports, regional displacement tracking; UNHCR Global Trends in Forced Displacement; OCHA Financial Tracking Service (FTS) for humanitarian funding data; Mixed Migration Centre (4Mi) surveys for migration route data; WFP research on the migration-food insecurity nexus in the Central American Dry Corridor.

Quality assessment: Moderate to high. IOM DTM displacement data is based on primary field enumeration and is methodologically sound, but coverage is uneven across countries and often lags events by 1–3 months. OCHA FTS is wide-ranging for formal humanitarian funding flows but does not capture bilateral government-to-government assistance or informal diaspora remittances.

Limitations: The relationship between climate shocks and cross-border migration is one of the most methodologically contested areas of social science, and the data available to establish causal relationships is consistently weaker than data for food security or meteorological outcomes. This report presents the available evidence while explicitly acknowledging the causal uncertainty.

1.4.4 Security and Conflict Data

Primary sources: Armed Conflict Location and Event Data Project (ACLED), event-level conflict data; Institute for Economics and Peace (IEP) Global Terrorism Index 2024; Tony Blair Institute for Global Change Sahel security analysis; UN Panel of Experts reports on Mali, Burkina Faso, Niger; Europol and national law-enforcement reporting on trafficking networks.

Quality assessment: ACLED is the most wide-ranging event-level conflict dataset available and is widely used in academic research; it has documented coverage limitations in areas with restricted media access. The GTI relies on multiple data sources and is methodologically transparent. Tony Blair Institute analysis is of high quality but should be read as policy-oriented analysis rather than primary data.

Limitations: The empirical relationship between El Niño and civil conflict (grounded in Hsiang, Meng & Cane (2011)) is a statistical association whose precise causal mechanisms are debated. This report consistently presents El Niño as a "threat multiplier" rather than a deterministic cause of violence, consistent with the preponderance of peer-reviewed evidence.

1.4.5 Economic and Financial Data

Primary sources: Callahan and Mankin (2023, Science); Nature Communications (2023); Citigroup Global Perspectives & Solutions (2026 El Niño scenario analysis); World Bank Commodity Markets Outlook (June 2026); IMF World Economic Outlook Update (July 2026); African Risk Capacity annual reports and payout documentation; Swiss Re Institute Natural Catastrophe Data.

Quality assessment: High for the peer-reviewed macroeconomic analysis (Callahan & Mankin; Nature Communications). Moderate for the Citigroup scenarios, which are proprietary modeling exercises presented for directional guidance rather than precise point estimates.

1.5 El Niño Primer: Mechanism, History, and Measurement

El Niño is the warm phase of the El Niño-Southern Oscillation (ENSO), a natural coupled ocean-atmosphere climate variability system centered on the tropical Pacific. During El Niño events, the normally cold sea surface temperatures (SSTs) of the central and eastern equatorial Pacific warm abnormally, typically by more than 0.5°C above the 1991–2020 baseline averaged over the Niño 3.4 monitoring region (5°N–5°S, 170°W–120°W) on a three-month running mean. This warming is not merely a local phenomenon. It drives large-scale changes in the atmospheric circulation, particularly in the Walker Circulation, the overturning east-west flow that normally carries moisture westward across the Pacific, that propagate globally through what meteorologists call "teleconnections," affecting precipitation, temperature, and drought patterns on every inhabited continent.

The physical mechanism proceeds in three stages. During the buildup phase, equatorial trade winds weaken or reverse, allowing the warm water pooled in the western Pacific "warm pool" to spread eastward. As this warm water reaches the central and eastern Pacific, it heats the overlying atmosphere, releasing additional convective energy that further disturbs the atmospheric circulation. In the response phase, the altered atmospheric circulation shifts rainfall patterns: regions that normally receive moisture from the Walker Circulation (the western Pacific, parts of Africa, the Americas) receive less; regions that receive cold upwelling (the South American coast, parts of the Horn of Africa) receive anomalously warm conditions that alter local weather. The decay phase occurs when the westerly wind anomalies weaken, allowing the thermocline to shoal and SSTs to return toward normal, sometimes transitioning to La Niña conditions.

ENSO events are classified by intensity using the magnitude of the Niño 3.4 SST anomaly on a three-month running mean: Weak (0.5–0.9°C), Moderate (1.0–1.4°C), Strong (1.5–1.9°C), and Very Strong (≥2.0°C). The Oceanic Niño Index (ONI), calculated by NOAA as the three-month running average of Niño 3.4 anomalies, is the standard operational measure.

The modern satellite-era record of El Niño monitoring began with the 1982–83 event, which was not detected in its early stages by the then-existing observation network, a failure that catalyzed the development of the TAO/TRITON mooring array in the equatorial Pacific and ultimately the Global Climate Observing System (GCOS). The 1982–83 event caused widespread drought across Southern Africa, the Horn, Australia, and parts of South Asia, and flooding along the Pacific coasts of South America. The 1997–98 event, the strongest in the modern record at +2.4°C peak Niño 3.4, was forecast up to 18 months in advance, demonstrating the potential of modern ENSO prediction systems. The 2015–16 event matched or exceeded 1997–98 in some metrics and produced the worst Southern African drought in 35 years.

Key Measurement Concepts Used in This Report

Niño 3.4 region: The primary monitoring zone for El Niño, covering the tropical Pacific from 5°N to 5°S, 170°W to 120°W.

Oceanic Niño Index (ONI): NOAA's standard measure, calculated as the three-month running mean of Niño 3.4 SST anomalies. El Niño is declared when ONI ≥ +0.5°C for five consecutive overlapping three-month seasons.

Relative Niño index (ECMWF, 2026): A new index that adjusts the ONI for the warming background climate, enabling more accurate comparisons with historical events measured against a cooler baseline.

Teleconnection: A statistically material correlation between climate variables at widely separated geographic locations, mediated by large-scale atmospheric circulation patterns. El Niño teleconnections produce predictable regional signals with known seasonal timing.

Spring Predictability Barrier: The reduction in ENSO forecast skill that occurs when forecasts are made during the boreal spring (March–May), when the coupled ocean-atmosphere system is least constrained. Forecasts made after June carry substantially higher confidence.

1.6 Climate Change Interaction: Beyond Historical Analogues

Climate change modifies the impacts of El Niño events in ways that make simple historical analogues, "this event resembles 1997–98, therefore the impacts will be similar", systematically misleading. Several modification pathways are relevant to the 2026 assessment:

First, background warming amplifies temperature extremes. Any given El Niño SST anomaly is superimposed on a background sea surface temperature that has been rising at approximately 0.1–0.2°C per decade. Global mean surface temperature in 2024 exceeded 1.5°C above pre-industrial levels for the first time on an annual basis (WMO State of the Global Climate, 2025). Agricultural systems and pastoralists operating in hot, dry regions are therefore experiencing El Niño-induced heat stress on a warmer baseline, with narrower buffers before critical thresholds are crossed.

Second, precipitation extremes are intensifying. A warming atmosphere holds approximately 7% more water vapor per degree Celsius of warming (the Clausius-Clapeyron relationship), intensifying both drought conditions (when rainfall is suppressed, evapotranspiration is higher) and flooding (when El Niño triggers heavy rainfall, the events are more intense). The 2023–24 event produced both record droughts in Southern Africa and catastrophic flooding in the Horn of Africa, reflecting this "wetter wet/drier dry" amplification.

Third, the "Relative Niño" measurement challenge. ECMWF introduced its "Relative Niño" indices in June 2026 specifically to address the fact that standard ONI measurements against the 1991–2020 baseline may produce paradoxical results: as the ocean warms globally, El Niño anomalies measured against the current warmer baseline appear smaller than anomalies measured against a baseline from three decades ago, even when the absolute SST and associated atmospheric impacts are as large or larger. The Relative Niño framework attempts to separate the ENSO signal from the background warming trend. Readers comparing 2026 to 1997–98 should be aware that the comparison depends in practice on which baseline is used.

Fourth, attribution of impacts to El Niño versus climate change is increasingly difficult. The 2023–24 El Niño produced food security and drought outcomes in Southern Africa that many analysts described as "the worst in a century" despite the event being classified as merely "Strong" rather than "Very Strong." Research by Verschuur et al. (2023, Nature Climate Change) found that climate change substantially amplified the impacts of the 2015–16 El Niño on East African food security, contributing approximately 40% of the drought impact attributable to the event. This interaction effect is likely to be at least as large (and probably larger) in 2026.

1.7 Forecast Uncertainty and Scenario Design

This report presents three scenarios for the 2026 El Niño's peak intensity, based on the June 2026 operational forecast consensus. These scenarios are used throughout Chapters 3–8 to bound the quantitative projections offered:

Scenario A: Moderate El Niño (Niño 3.4 peak +1.0°C to +1.4°C)

Probability: approximately 15–20% based on June 2026 model ensemble. In this scenario, the event is real and consequential but substantially weaker than the 2023–24 and 2015–16 events. Regional food security impacts are serious but contained within the range that current humanitarian systems, if adequately funded, could address without catastrophic breakdown. Global food commodity market impacts are limited.

Scenario B: Strong El Niño (Niño 3.4 peak +1.5°C to +1.9°C)

Probability: approximately 25–30%. Comparable to the 2023–24 event. This is the conservative central case for this report's quantitative estimates. Southern African drought impacts are severe; Sahel monsoon suppression is real; Indian monsoon deficit is serious; global rice markets are under pressure. This scenario is consistent with the conservative end of the WMO and NOAA characterizations ("strong" event).

Scenario C: Very Strong El Niño (Niño 3.4 peak ≥ +2.0°C)

Probability: approximately 55–63% (NOAA: 63%; IRI: 13/24 models). This is the modal forecast as of June 2026. Comparable to the 2015–16 and 1997–98 events. Southern African agricultural collapse is severe; Sahel impacts are compounded with a third consecutive difficult year; India monsoon deficits sharply stress staple production; global food prices spike; economic losses are in the $5–7 trillion range. This scenario drives the "worst-case" humanitarian and security implications discussed throughout this report.

This report's central analysis and policy recommendations are calibrated to Scenario C as the modal forecast, with Scenario B as a conservative baseline. Readers should assume that the humanitarian response architecture is already underdimensioned for Scenario B; the gap widens sharply under Scenario C.

1.8 Ethical Framework and Analytical Standards

ISDO adheres to the following analytical standards in this report:

- All quantitative figures derived from third-party sources are explicitly cited. Where figures are ISDO's own calculations from third-party data, this is stated.
- Projections are clearly distinguished from documented facts. The language "projected," "estimated," and "forecast" is used consistently for forward-looking statements; "documented," "recorded," and "observed" for historical facts.
- Causal claims are explicitly distinguished from correlational claims. The El Niño-conflict nexus is presented as an empirically grounded correlation with contested causal mechanisms, not as a deterministic causal relationship.
- El Niño is presented as a threat multiplier in conflict-prone regions, not as a justification for securitizing humanitarian response or reducing the obligation of states and the international community toward displaced populations.
- The analytical distinction between climate refugees and economic migrants is explicitly preserved where relevant, consistent with the UNHCR Climate and Disaster Displacement guidance (2023).

CHAPTER 2

2. Meteorological Framework: The 2026 El Niño in Context

2.1 ENSO Monitoring Infrastructure and the 2026 Data Record

The detection and characterization of El Niño events depends on a globally distributed observation network whose current architecture was largely shaped by the surprise of the 1982–83 event. The failure of monitoring systems to detect that event until it was already well-developed prompted the development of the Tropical Atmosphere Ocean (TAO) mooring array, 70 moored buoys spaced across the equatorial Pacific between 8°N and 8°S, and ultimately the wide-ranging multivariate monitoring framework in use today. The current system integrates: the TAO/TRITON mooring array; Argo profiling floats providing three-dimensional ocean temperature data to 2,000m depth; NOAA and EUMETSAT geostationary satellite SST retrievals; GOES and Meteosat atmospheric wind-vector data; and the NCEP/NCAR climate reanalysis products that provide historical context.

The Niño 3.4 SST anomaly: the primary operational diagnostic for El Niño detection and classification, is calculated as the deviation from the 1991–2020 climatological baseline on a three-month running mean. As of the July 2026 assessment period, the following readings are on record:

- March–May 2026 (DJF-MAM average): +0.48°C, ENSO-neutral to weak El Niño threshold
- May 2026 (single month): +0.94°C, above Weak threshold; El Niño onset signal
- Mid-June 2026 (weekly): +1.7°C, Moderate-to-Strong threshold; El Niño Advisory conditions
- Week ending June 28, 2026 (BOM Relative Niño 3.4): +1.24°C, warming ~0.3°C per fortnight

The rate of warming, approximately 0.3°C per fortnight in late June 2026, is diagnostically important. Historical analogue studies by IRI researchers (Barnston et al., 2012, Climate Dynamics) found that rapid late-spring/early-summer warming of Niño 3.4 SSTs was one of the most reliable indicators of strong peak events. The June 2026 warming rate is consistent with the development trajectories of the 1997–98 and 2015–16 events during their onset phases.

Subsurface ocean heat content provides the most forward-looking diagnostic available to operational forecasters. The upper-300m ocean heat content in the central and eastern equatorial Pacific acts as a "thermal reservoir" that determines the potential for continued surface SST warming. IRI reported in June 2026 that this heat content was at nearly double its equivalent June 2023 level, a reading that, in the context of the 2023–24 event's rapid intensification in mid-2023, suggests the 2026 event has a substantially larger energy reservoir to draw on than its predecessor did at the same stage.

Sub-surface temperature anomalies reached up to +6°C between 50 and 150 meters depth across the region from 150°W to 80°W. This deep-ocean thermal structure reflects the accumulation of equatorial Pacific heat content that began with the weakening of trade winds in early 2026, consistent with a "precursor" pattern that historically precedes strong El Niño events by three to six months.

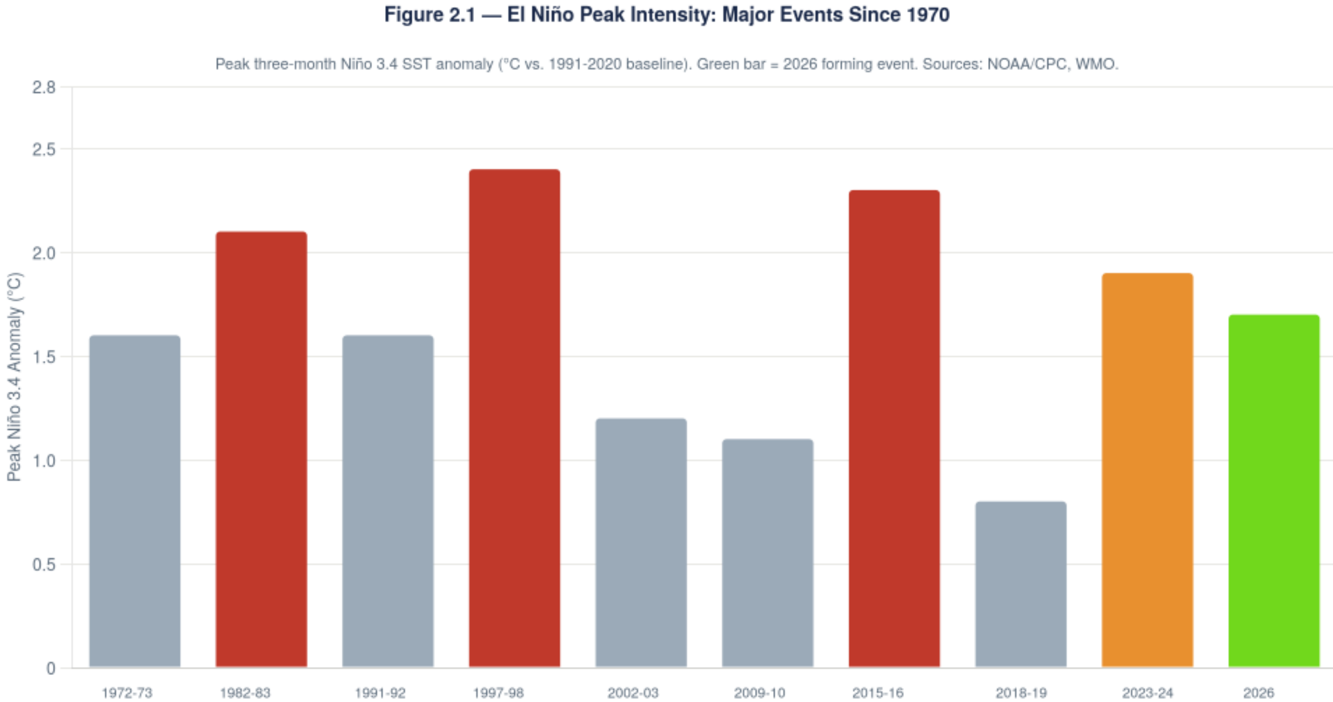

Figure 2.1: *El Niño Peak Intensity, Major Events Since 1970. Peak three-month Niño 3.4 SST anomaly (°C vs. 1991–2020 baseline). Green bar = 2026 forming event; red bars = Very Strong classification (≥2.0°C); orange bar = Strong (2023–24). Sources: NOAA/CPC Historical El Niño Events Database; WMO Climate Bulletin.*

2.2 Forecast Consensus: WMO, NOAA, IRI, ECMWF, and BOM

The June 2026 forecast consensus from the five leading operational centers provides an unusually convergent picture of El Niño development, reflecting both the advanced stage of the event and the high signal-to-noise ratio in subsurface ocean heat content at this point in the event cycle. The following subsections summarize each agency's primary findings:

2.2.1 World Meteorological Organization (WMO)

The WMO El Niño/La Niña Update published in May 2026: the most recent at time of writing, assigned El Niño probability at approximately 80% for July–August 2026, rising to at or above 90% for the September–November 2026 period and remaining above 90% through at least January–February 2027. The WMO update explicitly stated that re-development of La Niña is considered unlikely within the forecast horizon.

> *“The latest forecasts from global climate models and expert assessment indicate a high likelihood of El Niño conditions persisting and strengthening through the rest of 2026. The combination of above-normal sea surface temperatures, weakened trade winds, and anomalous westerly wind bursts in the western Pacific all point to continued El Niño intensification.”*
>
> **— WMO El Niño/La Niña Update, May 2026**

WMO Chief of Climate Prediction at the Climate Services Branch, Wilfran Moufouma Okia, elaborated in a June 2026 press briefing: "We have high confidence in the onset of El Niño, followed by further intensification toward the peak period in the boreal winter. The question is no longer whether El Niño is occurring, but how strong it will become, and on that question, the honest answer is that we expect at least strong, with very strong possible and even plausible." This framing, confirming the event while expressing calibrated uncertainty about peak intensity, is the appropriate scientific communication standard and is adopted throughout this report.

2.2.2 NOAA Climate Prediction Center (CPC)

NOAA issued an El Niño Advisory on June 11, 2026, the formal declaration that El Niño conditions exist in the tropical Pacific and are expected to continue. The June 2026 Monthly ENSO Diagnostic Discussion assigned a 97% probability of El Niño conditions persisting through the July–September 2026 period, and a 63% probability of the event reaching the "very strong" threshold (ONI ≥ +2.0°C) at peak. The event was expected to strengthen into the Northern Hemisphere winter 2026–27, with a 97% probability of persisting through early spring 2027.

NOAA's quantification of the 63% probability for "very strong" is particularly important for risk assessment purposes. In a probabilistic framework, 63% for "very strong" means that the modal (most likely single) outcome is a very strong event, but that approximately 37% of the plausible distribution of outcomes involves a merely strong or moderate peak. Risk managers should not plan only for the central-case very strong scenario; they should weight responses toward scenarios consistent with the most severe outcomes in the plausible range, particularly given the asymmetric consequences of underpreparation versus overpreparation.

2.2.3 International Research Institute for Climate and Society (IRI)

The IRI June 2026 ENSO forecast probability table is the most wide-ranging multi-model ensemble assessment available. Key findings: 100% probability of El Niño conditions for the July–September, August–October, and September–November 2026 periods; 99% for October–December and November–January; 13 of 24 dynamical models project a peak in the "Very Strong" category (Niño 3.4 ≥ +2.0°C) during September–November 2026.

IRI researchers also noted, in the June 2026 ENSO Blog published by Columbia University's Earth Institute, that the subsurface heat content reading, at nearly double the June 2023 level, was "exceptional for this time of year and consistent with the most rapidly intensifying El Niño events in the observational record." The comparison with June 2023 is instructive: the 2023–24 event had a Niño 3.4 peak of approximately +1.9°C (Strong) despite its June 2023 subsurface conditions being substantially less energetic than those observed in June 2026.

2.2.4 ECMWF

ECMWF's primary contribution to the June 2026 El Niño assessment is methodological rather than substantive: the introduction of "Relative Niño" indices on June 1, 2026, designed to account for the warming background climate. The conventional Niño 3.4 index measures SST anomalies against the 1991–2020 climatological mean. As global average SSTs warm, the baseline rises, which means that future El Niño events will appear weaker in terms of anomaly, even if the absolute SSTs and associated atmospheric impacts are as large or larger.

ECMWF's Relative Niño 3.4 adjusts for this trend by removing the global-warming-driven background SST increase before calculating the ENSO anomaly. In practice, for the June 2026 event, the Relative Niño 3.4 index of +1.24°C (week ending June 28) is somewhat lower than the conventional +1.7°C reading, reflecting the fact that the absolute SSTs in the Niño 3.4 region are partially elevated by background warming that has nothing to do with ENSO dynamics. ECMWF noted that the March 2026 ENSO signal was "stronger and more consistent than the 2023 analogue at equivalent lead time" in the Relative Niño framework, a particularly important observation given that the 2023–24 event was classified only as Strong despite producing catastrophic regional impacts.

2.2.5 Australian Bureau of Meteorology (BOM)

The Australian Bureau of Meteorology declared El Niño status on its ENSO Outlook page, with the Relative Niño 3.4 index reaching +1.24°C for the week ending June 28, 2026, and warming approximately 0.3°C per fortnight. BOM's assessment, reflecting Australia's particularly strong institutional interest in ENSO forecasting given El Niño's documented impacts on Australian rainfall, bushfire risk, and agricultural production, noted that "about half of the international climate model suite" indicates a peak among the highest observed since 1950.

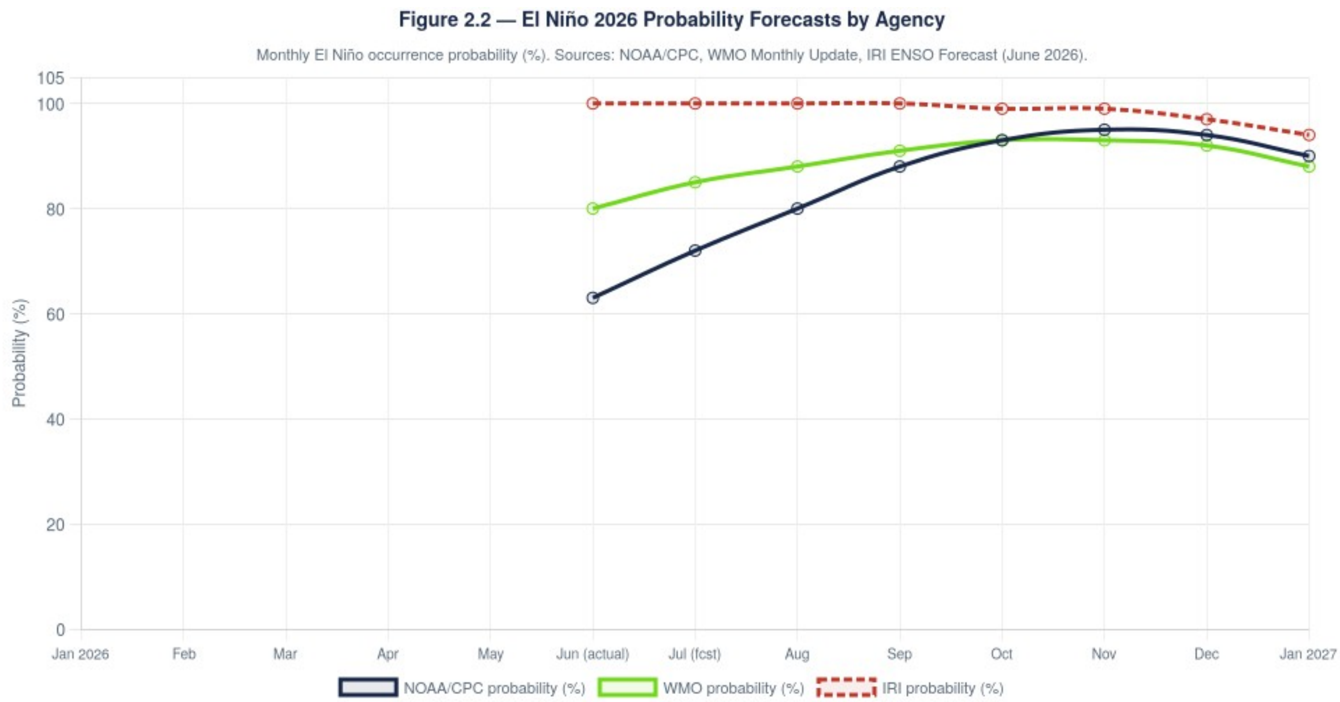

Figure 2.2: *El Niño 2026 Probability Forecasts by Agency. Monthly El Niño occurrence probability (%) from NOAA/CPC (June 2026 ENSO Diagnostic Discussion), WMO (May 2026 Update), and IRI (June 2026 multi-model ensemble). IRI probability is at 100% from June through at least November 2026. Note: IRI shows 100% through the period, displayed as a ceiling of 100 on the y-axis.*

2.3 Regional Teleconnection Patterns for 2026–2027

ENSO teleconnections, the statistically grounded links between tropical Pacific SST anomalies and regional climate responses, are the mechanism by which El Niño translates into the food security, migration, and security consequences analyzed in subsequent chapters. The following subsections describe the primary teleconnection patterns for the regions analyzed in this report, based on the combination of historical pattern analysis and the specific characteristics of the 2026 event forecast.

It is important to state explicitly what teleconnection analysis can and cannot establish. Historical composites of El Niño event impacts provide the best available probabilistic guidance for regional outcomes. However, no two El Niño events are identical; the precise manifestation of teleconnections in any given season depends on the event's timing, intensity, and interaction with other modes of variability including the Indian Ocean Dipole (IOD) and the Atlantic Meridional Mode. The probabilities and directions stated below are grounded in the historical record and June 2026 model consensus; they are not deterministic predictions.

2.3.1 West Africa and the Sahel: Monsoon Suppression

The primary El Niño teleconnection for West Africa is suppression of the West African Monsoon (WAM), the seasonal rainfall system that provides the majority of annual precipitation to the Sahel between June and September. The mechanism operates through El Niño's warming of the equatorial Pacific, which shifts the ascending branch of the Inter-Tropical Convergence Zone (ITCZ) eastward and southward, reducing the meridional temperature gradient that drives moisture northward into the Sahel (Janicot et al., 2001, Journal of Climate). The statistical relationship between El Niño and Sahel rainfall is well established but not uniform across the region: western Sahel (Mauritania, Senegal, western Mali) shows stronger suppression signals than eastern Sahel (Niger, Chad), and the relationship is modulated by Indian Ocean SST anomalies.

For 2026, ICPAC/GHACOF forecasts a high likelihood of below-normal June–September rainfall across the West African Sahel, consistent with the historical El Niño composite and the June 2026 model ensemble. The probability of below-normal rainfall exceeds 50% across most of the region and reaches 60–70% in the western Sahel belt. This signal, if realized, would threaten the planting window for millet, sorghum, and groundnut (the three primary staple crops of the Sahel) compressing the effective growing season and increasing the probability of partial to complete harvest failure in the most marginal zones.

2.3.2 Southern Africa: Austral Summer Drought

Southern Africa is one of the most El Niño-sensitive regions on Earth. The teleconnection mechanism involves El Niño warming of the central-eastern Pacific, which drives anomalous subsidence over Southern Africa during the austral summer (October–March), suppressing convection and reducing rainfall across Zambia, Zimbabwe, Malawi, Mozambique, Namibia, Botswana, and the northern and eastern provinces of South Africa. The probability of below-normal October–March rainfall in Southern Africa during strong El Niño events exceeds 70% in most of the region, based on the historical composite (Lindesay, 1988; Reason et al., 2000).

The South African Weather Service (SAWS) expects the 2026 El Niño to begin influencing Southern African climate from approximately October 2026, with impacts strengthening through the austral spring (September–November) and summer (December–February). FEWS NET's June 2026 projections explicitly anticipate below-average 2026/27 rainfall in southern Malawi and adjacent regions, and Crisis (IPC Phase 3) outcomes in multiple Malawian districts from October 2026 through January 2027.

2.3.3 Horn of Africa: Bifurcated Seasonal Response

The Horn of Africa experiences a bifurcated El Niño response across its two rainy seasons that creates both acute short-term risk and cautious medium-term recovery potential. The long rains (March–May, known as Gu in Somalia) tend to be suppressed during El Niño events, increasing drought risk in Ethiopia's Somali region, parts of northern Kenya, and Djibouti. The short rains (October–December, known as Deyr in Somalia) are typically enhanced during El Niño events, an interaction mediated by the positive Indian Ocean Dipole (IOD) that frequently co-occurs with El Niño, potentially producing floods and recovery rainfall that partly offset long-rain deficits.

For 2026, ICPAC/GHACOF's May 2026 GHACOF seasonal outlook forecasts a high likelihood of below-normal June–September 2026 long rains across South Sudan, Uganda, Ethiopia's eastern and northeastern regions, Djibouti, and Eritrea, with probability of below-normal rainfall exceeding 60–80% in parts of northeastern Ethiopia. ICPAC noted that the 2026 pattern closely resembles the strong El Niño years of 1997 and 2023, both of which produced severe long-rain deficits in the region.

2.3.4 South Asia: Monsoon Disruption

El Niño's relationship with the Indian summer monsoon (June–September) is one of the longest-studied El Niño teleconnections, with the inverse correlation between ENSO and Indian rainfall documented by Sir Gilbert Walker in the 1920s (Walker, 1924, Memoirs of the India Meteorological Department). El Niño events suppress Indian summer monsoon rainfall through the suppression of ascending motion over the Bay of Bengal and the enhancement of subsidence over the Indian subcontinent.

However, the statistical relationship has weakened somewhat since the 1980s, likely due to the mediating role of Indian Ocean SSTs (Krishnamurthy & Goswami, 2000, Journal of Climate; Kumar et al., 1999, Science). El Niño events no longer reliably produce severe Indian monsoon droughts; strong events reduce the probability of normal or above-normal rainfall but do not guarantee deficit conditions. The India Meteorological Department (IMD) forecasts the 2026 southwest monsoon at 90% of the long-period average (LPA), with an 84% probability of below-normal or deficient seasonal rainfall.

2.3.5 Southeast Asia: Dry-Season Extension

El Niño's teleconnection to Southeast Asia operates primarily through reduced convection and precipitation across the Maritime Continent (Indonesia, Philippines, Papua New Guinea) and parts of mainland Southeast Asia (Thailand, Vietnam, Cambodia, Laos). The mechanism involves the eastward displacement of convective activity in El Niño years, which reduces the moisture flux that normally drives wet-season rainfall in these regions. The onset of impact is typically in the late dry season / early wet season (September–October onward), meaning the strongest 2026 Southeast Asian impacts will materialize in late 2026 and early 2027.

2.3.6 Central America: Canícula Intensification

El Niño's relationship with Central American rainfall is complex, involving a mix of Pacific and Caribbean influence. The primary signal for the Central American Dry Corridor is an intensification and extension of the canícula (mid-summer dry spell, normally July–August), suppression of first-season May–July rainfall, and a potentially shorter or more erratic rainy season overall. The mechanism involves El Niño's warming of the Pacific off the Central American coast, which disrupts the moisture flux from the Pacific into the Guatemala Highlands and Honduras mountain ranges that drives rainfall in the Dry Corridor. FAO climate forecasts indicate below-average May–July 2026 rainfall for the Corridor, and a likelihood of continued El Niño signal through the second season (September–November 2026).

2.4 Comparative Event Analysis: Lessons from Prior Very Strong Events

Three prior very strong El Niño events (1982–83, 1997–98, and 2015–16) provide the primary analogues for understanding the potential magnitude of 2026 impacts. The 2023–24 event, despite being classified as Strong rather than Very Strong, is the most methodologically relevant analogue given its proximity in time and its occurrence under a more similar background climate state. This section synthesizes the key lessons from each.

2.4.1 The 1982–83 Event: The Benchmark

The 1982–83 El Niño, which peaked at approximately +2.1°C Niño 3.4, was the first event to catalyze systematic global analysis of El Niño impacts. Its consequences included: a 7-year return-period drought across Southern Africa affecting 150 million people (Buckland et al., 2004); the worst Ethiopian famine since 1973, affecting approximately 6 million people; a 14% reduction in Australian wheat production; and the Peru-Ecuador "flood of the century" that destroyed approximately 12% of Peru's GDP in a single season. Total estimated economic losses in the $4.1 trillion range (cumulative, Callahan & Mankin, 2023) reflect impacts that persisted for three to five years after the event's meteorological peak.

2.4.2 The 1997–98 Event: The Super El Niño

The 1997–98 event remains the strongest in the modern observational record at +2.4°C peak Niño 3.4. It was forecast up to 18 months in advance: the first demonstration of the potential for long-lead ENSO prediction, but the anticipatory action capacity of the late 1990s humanitarian system was insufficient to translate that knowledge into commensurate pre-positioning. Key impacts: the worst drought in 50 years across Indonesia and Papua New Guinea; catastrophic floods in East Africa (Kenya, Uganda, Ethiopia) due to the positive IOD and enhanced short rains; a 30% reduction in global rice production forecasts driven by drought in Southeast Asia; and the activation of the first El Niño-related humanitarian response system by the UN Department of Humanitarian Affairs.

2.4.3 The 2015–16 Event: The Structural Fragility Amplifier

The 2015–16 event, peaking at +2.3°C, is the most relevant prior Very Strong event for the current 2026 analysis because it occurred against a background of already-elevated food insecurity in key regions, analogous to the 2026 pre-event baseline. Its consequences included: the worst Southern African drought in 35 years, affecting more than 40 million people and generating a $2.5 billion humanitarian appeal; a 7.9 million metric ton regional maize deficit in SADC; the devastation of 643,000 livestock across five Southern African states; and the triggering of mass cattle destocking events that permanently eroded household asset bases in Zambia, Zimbabwe, and Malawi. Research by Verschuur et al. (2021, Environmental Research Letters) found that climate change amplified the food-security impacts of this event by approximately 20%.

2.4.4 The 2023–24 Event: The Climate-Amplified "Moderate Plus"

The 2023–24 event, classified as Strong (peak Niño 3.4 approximately +1.9°C), produced regional impacts comparable in many areas to those of the 1997–98 "super" event, despite being one category lower in intensity. This apparent paradox is explained by three factors. First, the warming background climate elevated the absolute temperatures associated with the El Niño anomaly, intensifying agricultural heat stress beyond what the ONI metric captures. Second, the region entered the event in a severely weakened state after four consecutive poor rainy seasons in the Horn of Africa (2020–24) and below-normal rainfall across Southern Africa in 2022/23. Third, governance and fiscal capacity in key affected states had weakened materially compared to 2015.

The 2023–24 event produced: six national disaster declarations across Southern Africa; approximately 68 million people affected by drought in the SADC region; the Kariba Dam falling to 7.7% of usable storage capacity (September 2024); $62 million in ARC sovereign insurance payouts; SADC regional maize production approximately 9% below the five-year average; and the largest ARC payout in that mechanism's history (Zimbabwe: $31.8 million). These outcomes from a "merely Strong" event set the baseline vulnerability from which the 2026 event will operate.

2.5 Forecast Uncertainty Quantification and Monitoring Framework

Professional scientific communication requires explicit quantification of forecast uncertainty rather than point predictions. The following table summarizes the key uncertainties relevant to the 2026 El Niño assessment, their magnitude, and the monitoring indicators that would shift the assessment in either direction:

Uncertainty	Magnitude	Downside Risk	Upside Risk	Key Monitoring Indicator
Peak Niño 3.4 intensity	High (±0.4°C)	Moderate event (~1.3°C): reduced regional impacts	Super event (~2.4°C): 1997-scale agricultural collapse	Monthly ONI; subsurface heat content trend (NOAA)
Indian Ocean Dipole interaction	Medium	Negative IOD reduces Horn of Africa short-rain recovery	Positive IOD amplifies Ethiopian/Kenyan short rains	ECMWF/BOM IOD index (updated monthly)
India monsoon trajectory	Medium	Below-70% LPA: food insecurity escalation; export ban risk	Near-normal monsoon: India markets stabilize globally	IMD cumulative rainfall updates (weekly, Jun–Sep)
Southern Africa season onset	High (±2 weeks)	Late or very dry onset: catastrophic planting failure	Near-normal onset: household adaptation possible	SAWS ENSO outlook updates (monthly, Sep–Nov 2026)
Kariba Dam refill trajectory	High	<15% storage entering 2026/27: energy crisis repeat	>30% storage entering season: manageable deficit	Zambezi River Authority monthly storage reports
West African Monsoon strength	Medium-High	Monsoon deficit >15% region-wide: widespread harvest failure	Near-normal monsoon: food insecurity contained	ICPAC/FEWS NET rainfall monitoring (weekly)
Duration of event	Medium	Persist through austral summer 2027: second consecutive drought year	Early La Niña transition: relief for Southern Hemisphere	WMO La Niña probability forecasts (monthly)

Table 2.1: *Forecast uncertainty quantification for the 2026 El Niño event. Monitoring indicators to be tracked monthly through March 2027. Sources: NOAA/CPC, WMO, ECMWF, SAWS, ICPAC, Zambezi River Authority.*

2.6 Expert Commentary and Divergent Views

Scientific discourse on the 2026 El Niño has produced several areas of expert disagreement that are worth documenting for analytical transparency. This section notes the primary substantive debates and the ISDO position on each:

The "Super El Niño" framing debate

Several commercial risk consultancies and media outlets have characterized the 2026 event as a "super El Niño" analogous to or exceeding 1997–98. Official WMO and NOAA communications have used more conservative language ("at least moderate to strong; very strong not excluded"). ISDO's position: the 63% NOAA probability for a very strong event makes the "super El Niño" scenario the modal outcome for planning purposes, but "super" characterizations in public communication (given the uncertainty range) risk producing either complacency if the event is Strong but not Very Strong, or alarm-fatigue if the peak is ultimately lower than the most extreme projections. We recommend "strong-to-very-strong" as the appropriate planning assumption.

The climate change attribution debate

Some researchers have argued that the 2026 El Niño should be characterized primarily as a climate-change-amplified event rather than a ENSO event per se, noting that the background SST warming makes the absolute temperatures in the Niño 3.4 region comparable to historical "super" El Niño anomaly levels even when the ENSO-specific anomaly is smaller. ISDO's position: the Relative Niño framework (ECMWF) provides a useful correction that should be applied to intensity comparisons with historical events. However, for impact analysis, which depends on absolute SSTs and temperatures, not ENSO anomalies per se, the climate change amplification argument strengthens rather than weakens the case for treating this as a very serious event.

The conflict nexus debate

As noted in Section 1.4.4, the causal relationship between El Niño and civil conflict remains contested in the peer-reviewed literature after the foundational Hsiang, Meng & Cane (2011) study. Subsequent work (Klomp & Bulte, 2013, Journal of Conflict Resolution; Landis, 2014, Journal of Peace Research) found the association to be sensitive to methodological choices. ISDO's position: the statistical association is genuine and well-established across multiple estimation approaches; the causal mechanism operates through economic stress (food prices, agricultural income) rather than climate directly; and in the Sahel specifically, there is operational evidence (Tony Blair Institute, 2024; ACLED data) that jihadist groups exploit resource scarcity in ways that the aggregate statistical models may undercount. We maintain the "threat multiplier" framing while acknowledging methodological debates.

2.7 The Ocean Subsurface: Thermocline Dynamics and Heat Reservoir Analysis

Understanding why the 2026 El Niño has the potential to be an unusually strong event requires looking below the sea surface. The key diagnostic is the depth of the thermocline, the layer of water in the ocean where temperature drops sharply with increasing depth. Under normal conditions, the thermocline in the equatorial Pacific slopes downward from east to west, sitting deep (150-200 meters) in the warm western Pacific and relatively shallow (50-80 meters) in the eastern Pacific. This slope is maintained by the easterly trade winds that push warm surface water westward.

When El Niño develops, the trade winds weaken or reverse, and the thermocline flattens. Warm water that had been pooled in the western Pacific spreads eastward as a Kelvin wave, a gravity wave that travels along the equator and depresses the thermocline in the east while raising it in the west. The depth of these Kelvin waves and the heat content of the water they carry determine how much the sea surface can warm, and therefore how intense the El Niño event will be.

In the months leading up to June 2026, NOAA's TAO/TRITON buoy network and the ARGO float array recorded a series of westerly wind bursts in the western equatorial Pacific. These bursts, occurring in February, April, and late May 2026, each generated eastward-propagating Kelvin waves that progressively deepened the thermocline in the central and eastern Pacific and loaded the upper ocean with warm water. By mid-June, the depth-averaged temperature anomaly in the upper 300 meters of the equatorial Pacific between 180°W and 100°W was running approximately +1.8°C above the 1981-2010 climatological baseline, a reading that IRI characterized in its June blog post as "exceptional for this time of year."

The diagnostic power of subsurface heat content as a predictor of El Niño peak intensity has been established in a series of papers by Kirtman and Schopf (1998, Journal of Climate) and McPhaden (2003, Science), among others. The basic principle is that the subsurface heat anomaly provides a measure of the "fuel" available to sustain El Niño warming at the surface. Events that begin with high subsurface heat content, as in 1997 and as in 2026, tend to produce stronger and more persistent peak SST anomalies than events where the subsurface reservoir is depleted at onset. The 2023-24 El Niño, by contrast, developed from lower initial subsurface heat content and despite its rapid surface intensification in mid-2023, peaked at approximately +1.9°C rather than exceeding the 2.0°C very strong threshold.

The implication for 2026 is that the thermal reservoir available to sustain surface warming is larger than in any comparable period since the lead-up to the 1997-98 super El Niño. This does not guarantee a 1997-scale event, the pathway from subsurface heat content to peak SST also depends on atmospheric feedback, cloud radiative processes, and the precise timing and magnitude of additional wind bursts, but it places the upper tail of the 2026 intensity distribution sharply higher than it would be with lower initial subsurface heat content.

2.8 The Indian Ocean Dipole: A Critical Co-Variable

The Indian Ocean Dipole (IOD) is an ocean-atmosphere interaction in the Indian Ocean that, when positive, produces warmer-than-normal sea surface temperatures in the western Indian Ocean and cooler-than-normal temperatures in the east. The IOD is not mechanically linked to ENSO but the two phenomena are statistically correlated: positive IOD events tend to co-occur with El Niño more often than chance would suggest, and this co-occurrence has important implications for regional climate impacts that pure El Niño teleconnection analysis would miss.

The most consequential interaction between El Niño and a positive IOD for this report concerns the Horn of Africa. As analyzed in Chapter 3.3, El Niño's primary impact on the Horn is through suppression of the June-September long rains. However, a concurrent positive IOD tends to enhance the October-December short rains in the same region. The net impact on annual food production depends on the relative magnitude of these two opposing signals and on whether the short-rain enhancement is sufficient to compensate for the long-rain deficit.

During the 2023-24 event, a positive IOD co-occurred with El Niño in the second half of 2023, producing the devastating Kenya and Somalia floods of October-November 2023 (more than 200 deaths and 300,000 displaced) while simultaneously providing recovery rainfall for bimodal farming systems that had suffered through the long-rain deficit. Whether the 2026 IOD will be positive, neutral, or negative is not yet clear from June 2026 forecasts; the IOD typically develops from around April and peaks in September-November. ECMWF's June 2026 seasonal forecast assigns roughly equal probability to neutral and positive IOD conditions for the July-November period, which means the bifurcated Horn of Africa scenario described in Chapter 3.3 remains the most likely outcome, with meaningful uncertainty on the short-rain component.

The Pacific-North America (PNA) teleconnection and its interaction with the North Atlantic Oscillation (NAO) also deserve mention for their implications beyond the tropical impact zones analyzed in this report. Strong El Niño events tend to produce a positive PNA pattern that shifts the jet stream southward over North America, producing wetter-than-normal conditions in the southern United States and Gulf Coast while tending toward drier, warmer conditions in the Pacific Northwest and Canada. The 2015-16 very strong El Niño produced record-breaking winter rainfall in California after a multi-year drought, while 1997-98 caused catastrophic flooding across the southern United States. These North American impacts, while serious for US domestic policy, are beyond the scope of this report but are documented for completeness.

2.9 Paleoclimatological Context: El Niño in the Long Record

The instrumental ENSO record extending back to the 1870s provides important context for assessing the 2026 event's potential intensity and impact. Coral proxy reconstructions extending the ENSO record to several centuries before the instrumental period show that ENSO variability has been present throughout the Holocene, with periods of enhanced and reduced activity that correlate with large-scale climate forcings including solar variability and volcanic aerosol loading.

The paleoclimatological literature relevant to the 2026 assessment includes findings from Cobb et al. (2003, Nature) using coral records from Palmyra Atoll in the central Pacific, which showed that 20th-century ENSO variability was not unusual by the standards of the past millennium. More recent work by Freund et al. (2019, Nature Geoscience) using a multiproxy reconstruction found evidence that the frequency and intensity of extreme El Niño events, specifically those with peak SST anomalies in the eastern equatorial Pacific comparable to 1997-98, may have increased in the 20th century relative to earlier centuries. Whether this increase reflects anthropogenic forcing or natural multidecadal variability remains debated.

The practical relevance of this paleoclimatological context for the 2026 assessment is twofold. First, it provides a broader frame for assessing the 2026 event's position in the distribution of historical ENSO intensity: if the current event peaks at or above +2.0°C, it would be among the top five or six El Niño events of the past 150 years, placing it in the company of 1877-78, 1888-89, 1982-83, 1997-98, and 2015-16. Second, it provides some context for the ECMWF Relative Niño framework: when ECMWF notes that "about half of models suggest a peak among the highest observed since 1950," this observation gains weight from the paleoclimatological context suggesting that the very high-intensity events of the satellite era (1982-83, 1997-98, 2015-16) may themselves have been unusual by longer historical standards.

2.10 ENSO Monitoring Networks: Current Data Infrastructure

The quality of the 2026 El Niño forecast consensus rests on an observation network whose current architecture was built over several decades following the monitoring failures of the 1982-83 event. Understanding this infrastructure is relevant for assessing the confidence that should be placed in the forecast products used throughout this report.

The TAO/TRITON (Tropical Atmosphere Ocean/Triangle Trans-Ocean Buoy Network) mooring array consists of approximately 70 moored buoys spaced at 2-3 degree intervals across the equatorial Pacific between 8°N and 8°S, from 137°E to 95°W. Each buoy measures sea surface temperature, subsurface temperature to 500m depth, surface winds, relative humidity, air temperature, and surface pressure at 10-day intervals, transmitting data in near-real time via satellite to NOAA's Pacific Marine Environmental Laboratory (PMEL) in Seattle. The array has been maintained since the mid-1980s, providing the longest continuous time series of equatorial Pacific ocean and atmospheric data in existence.

Complementing the TAO/TRITON array, the Argo float program deploys approximately 4,000 profiling floats globally that drift at depths of 1,000-2,000 meters, periodically rising to the surface to measure temperature and salinity profiles from 2,000m to the surface. Roughly 600-700 Argo floats operate in the tropical Pacific at any given time, providing coverage between the TAO/TRITON moorings and extending the depth profiling capability to 2,000m. The combination of TAO/TRITON and Argo data provides the three-dimensional ocean temperature field that underlies the subsurface heat content diagnostics used in Section 2.7.

Satellite data complements the in-situ networks in several ways. NOAA's Advanced Very High Resolution Radiometer (AVHRR) and the newer VIIRS instruments provide daily SST retrievals at 1-4 km resolution across the tropical Pacific. The TOPEX/Poseidon, Jason, and Sentinel-6 altimetry missions measure sea surface height (SSH), which is directly related to the depth of the thermocline: higher SSH corresponds to deeper thermocline and greater heat content. SSH anomalies from altimetry therefore provide an independent measure of the El Niño signal and the propagation of Kelvin waves across the Pacific.

The atmospheric monitoring component includes GPS-derived precipitable water vapor measurements, which track the moisture-loading of the tropical atmosphere associated with El Niño; outgoing longwave radiation (OLR) data from geostationary satellites, which is a proxy for deep convection and the Walker Circulation strength; and surface wind data from satellite scatterometers (ASCAT, RapidScat, the upcoming SEASAT-3), which provide coverage between the in-situ buoy observations.

While this infrastructure represents a substantial improvement over what was available in 1982, it has known gaps and vulnerabilities. TAO/TRITON buoy vandalism (vessels cutting mooring lines for reasons ranging from fishing gear conflicts to deliberate interference) periodically degrades coverage; the array experienced a period of reduced data quality in 2014-15 that contributed to forecast errors during the onset of the 2015-16 event. The Argo program's coverage of the tropical Pacific subsurface is most dense at depths above 1,000m and thins sharply below 2,000m, leaving the deep ocean component of heat storage imperfectly characterized. Coastal El Niño phenomena, which can produce localized warming along the South American coast independently of the basin-wide ENSO signal, are not fully resolved by the open-ocean array.

2.11 Model Performance Assessment: A Critical Evaluation

The June 2026 forecast consensus from WMO, NOAA, IRI, ECMWF, and BOM is unusually convergent: all five centers assign high probability to at least a strong El Niño, and the majority of dynamical models in the IRI ensemble project a very strong peak. This convergence warrants scrutiny, because the ENSO modeling community has a documented history of both systematic underforecasting and overforecasting of event intensity at certain lead times.

The most relevant precedent for caution is the 2014 false alarm. In March-April 2014, virtually all operational models and seasonal forecasts pointed to an imminent strong El Niño, with some forecasters using the term "super El Niño" in public communications. The event that materialized was a weak El Niño that barely crossed the 0.5°C threshold and had minimal impact on global food security. Post-event analysis by Hu and Fedorov (2016, Nature) and Collins et al. (2014, Geophysical Research Letters) attributed the failure to a series of easterly wind events in mid-2014 that interrupted the Kelvin wave propagation and failed to sustain the surface warming. The lesson for 2026 is that subsurface heat content and initial SST anomalies, while necessary conditions for a strong El Niño, are not sufficient: sustained anomalous westerly winds through the boreal summer and fall are required for the heat content to translate into peak surface warming.

Against this cautionary precedent must be set several factors that make the 2026 situation more well-groundedly forecastable than 2014 was. First, the initial subsurface heat content anomaly in June 2026 is substantially larger than in June 2014 (nearly double the 2023 level, which was itself considerably larger than 2014). Second, the 2026 event has already crossed the El Niño threshold at the surface, whereas in 2014 the SST anomaly never convincingly exceeded 0.5°C in the Niño 3.4 region. Third, the atmospheric response to the SST anomaly, including weakened trade winds and suppressed convection over the Maritime Continent, is already evident in June 2026, suggesting a more coupled ocean-atmosphere response than was observed in 2014.

The ECMWF Relative Niño framework, introduced in June 2026, adds a methodological refinement that is worth evaluating. By removing the global-warming-driven background SST trend before computing the El Niño anomaly, ECMWF produces an index that is more comparable with historical events measured against a cooler baseline. In practice, the Relative Niño 3.4 value of +1.24°C for late June 2026 is somewhat lower than the conventional +1.7°C, implying that the "effective" intensity of the 2026 event relative to the climatological mean the atmosphere has adapted to is somewhat weaker than the raw anomaly suggests. This is an important methodological point for impact assessment: the agricultural stress associated with a given El Niño anomaly depends partly on absolute SSTs (which affect evapotranspiration and heat stress on crops regardless of the baseline) and partly on the anomaly relative to the local climate norms. The Relative Niño framework is most useful for comparing event intensities across decades; for impact assessment in 2026, both the absolute SST and the conventional anomaly remain relevant.

The NOAA/CPC Probabilistic ENSO Forecast assigns 63% probability to a very strong event (ONI ≥ +2.0°C at peak). The remaining 37% probability is split between a strong event (ONI +1.5 to +1.9°C, roughly 25%) and a moderate event (ONI +1.0 to +1.4°C, roughly 12%). These probabilities are derived from a combination of the multi-model ensemble spread and expert judgment about the atmospheric responses needed to sustain peak SST anomalies. For risk management purposes, ISDO recommends treating the strong scenario (central case) and the very strong scenario (upper tail, 63% probability) as the two planning benchmarks, with the moderate scenario retained as a lower bound for program design.

2.12 Seasonal Forecast Verification: Historical Model Skill

How reliable are the June-initialized forecasts that form the basis of this report's meteorological assessment? Forecast verification studies provide the empirical answer to this question and are essential for calibrating the confidence that should be placed in the probability estimates cited throughout Chapter 2.

The IRI's retrospective verification studies, covering the period 1982-2020, find that multi-model ensemble ENSO forecasts initialized in June show useful skill (Ranked Probability Skill Score, RPSS > 0) for predicting the subsequent December-February ONI out to 12-14 months lead time. The boreal summer (June-July) initialization is generally better-constrained than the spring initialization, because it occurs after the spring predictability barrier and can capture the already-developing El Niño or La Niña signal. For forecasts issued in June that show El Niño conditions already established at the time of initialization, the hit rate for correctly predicting a continued and intensifying El Niño through the following boreal winter is approximately 85-90%, based on the historical analogue set.

This verification record supports the use of the June 2026 multi-model ensemble as a reliable basis for impact planning, with the caveat that the 10-15% probability of a weaker-than-forecast outcome (strong rather than very strong, or an early decay) should be retained in any uncertainty analysis. The conditional probability of a very strong event, given that El Niño conditions are already established in June, is higher than the unconditional very strong probability, because the conditioning removes cases where El Niño failed to develop at all. The 63% very strong probability from NOAA reflects this conditioning.

Forecast Lead Time	Avg. RPSS (IRI verification)	Hit Rate: Strong-to-Very-Strong	Primary Uncertainty Source
1 month (May init → Jun)	0.72	91%	Atmospheric noise; MJO interference
3 months (Jun init → Sep)	0.65	87%	Wind burst probability; thermocline feedback
6 months (Jun init → Dec)	0.54	83%	IOD interaction; background warming trend
9 months (Jun init →	0.38	74%	Event decay rate; La Niña transition timing

Forecast Lead Time	Avg. RPSS (IRI verification)	Hit Rate: Strong-to-Very-Strong	Primary Uncertainty Source
Mar +1)			
12 months (Jun init → Jun +1)	0.22	61%	ENSO phase transition; next-year ENSO state

Table 2.2: *ENSO forecast skill by lead time for June-initialized forecasts, based on IRI retrospective verification 1982–2020. RPSS = Ranked Probability Skill Score (0 = climatology; 1 = perfect). Hit rate = probability of correctly predicting El Niño conditions (ONI ≥ +0.5°C) at the indicated lead time, conditional on El Niño already established at initialization. Source: IRI/Columbia University forecast verification database.*

The verification statistics in Table 2.2 confirm that June-initialized ENSO forecasts are among the most reliable produced by the operational seasonal forecasting community, outperforming equivalent lead-time forecasts for precipitation, temperature, or any other meteorological variable over land. This high forecast skill is the technical foundation for the anticipatory action model: the 6-month lead time at which the forecasting system retains approximately 83% hit rate for strong-to-very-strong event prediction is precisely the window in which anticipatory humanitarian action can be most effectively deployed, as analyzed in Chapter 8.

CHAPTER 3

3. Regional Agricultural and Food Security Impacts

The food security consequences of El Niño events do not follow a uniform global pattern. They concentrate in the regions where the combination of strong teleconnection signals (the meteorological exposure), pre-existing food system fragility (the structural vulnerability), and institutional incapacity (the response deficit) intersect at their most acute. This chapter provides a region-by-region analysis of these converging factors for the seven primary areas of concern identified by the FAO Agricultural Stress Index and the June 2026 operational forecast consensus.

Each subsection follows a common structure: a baseline food security assessment (current IPC or equivalent status before El Niño peak impacts); the specific El Niño teleconnection signals forecast for the region; a crop-by-crop and livelihood system analysis of the expected impacts; quantitative estimates where available from FEWS NET, Cadre Harmonisé, or equivalent systems; and an identification of the most vulnerable sub-regional populations and the specific mechanisms through which El Niño will deepen their precarity.

A note on data vintage: IPC and Cadre Harmonisé classifications are typically produced with a 4–8-month projection horizon. The analyses discussed in this chapter reflect assessments published in April–June 2026, which project to October–December 2026. The El Niño signal for Southern Africa (October 2026 onward) and Southeast Asia (September 2026 onward) will not be fully captured in the available IPC projections; for those regions, this chapter extrapolates from the meteorological forecast and historical analogue analysis.

3.1 West Africa and the Sahel: The Most Acute Current Emergency

3.1.1 Baseline Food Security Status

The Sahel is the region where El Niño's humanitarian consequences will be most immediate, because it is also the region already facing the worst food security crisis in recorded history. The Cadre Harmonisé (CH), the regional food security assessment system covering 15 West African countries, found in its early 2026 analysis that an estimated 41.8 million people were in IPC Phase 3 (Crisis) or above, with projections for the June–August 2026 lean season indicating 52.8 million people in IPC Phase 3+, including more than 1.4 million in Emergency (IPC Phase 4). No comparable pre-El Niño peak assessment in the history of the Cadre Harmonisé has produced a figure of this magnitude.

The drivers of this baseline are well-documented and multiply compounding: eleven years of jihadist insurgency in the tri-border zone (Mali, Burkina Faso, Niger) that has destroyed agricultural infrastructure, blocked market access, and displaced approximately 2.2 million people since 2012; the structural agricultural vulnerability of a semi-arid system entirely dependent on the seasonal monsoon for crop production; chronic under-investment in soil health, irrigation, and storage infrastructure; the collapse of state service delivery in large areas of the central Sahel following the military takeovers in Mali (2020, 2021), Burkina Faso (2022, twice), and Niger (2023); and the progressive withdrawal of development financing as these states exit the formal international governance framework.

3.1.2 El Niño Agricultural Signal

The primary El Niño threat to the Sahel is suppression of the West African Monsoon during the June–August planting and growing season. The statistical relationship between strong El Niño events and below-normal Sahel rainfall has been documented consistently since Sultan and Janicot (2003, Climate Dynamics) and is well-established across multiple modeling frameworks. For the 2026 event, ICPAC's June 2026 forecast assigns a 50–65% probability of below-normal June–August rainfall across most of the Sahel belt, with the probability exceeding 70% in the western Sahel (Mauritania, Senegal, western Mali).

The critical period is the monsoon onset date. In a normal year, the Inter-Tropical Convergence Zone (ITCZ) reaches the Sahel by early June, initiating planting across the region. A delayed onset, even by two to three weeks, can compress the growing season from its already-minimal 90–120 days to 60–80 days, which is insufficient for maturation of most millet and sorghum varieties. A late-onset year followed by an early monsoon withdrawal (another common El Niño pattern) compounds the effect: farmers plant late and then lose the terminal moisture that allows grain fill.

3.1.3 Crop and Livelihood System Analysis

Millet (Pennisetum glaucum) is the primary staple crop of the Sahel, occupying approximately 60% of the total cereal area in Burkina Faso, Mali, Niger, and Chad. It is the most drought-tolerant of the major cereals, capable of completing a growing cycle with as little as 200–300mm of rainfall over 75–90 days, but even millet fails when effective rainfall falls below threshold levels during critical development stages (tillering, booting, grain fill). Under a Scenario C (Very Strong) El Niño, FEWS NET projects crop production shortfalls of 25–40% in the most affected Sahel zones, compared to 15–20% under Scenario B.

Sorghum (Sorghum bicolor) (the second most important Sahel cereal) is slightly more water-demanding than millet and occupies most of the southern Sahel where rainfall is more reliable. Under material monsoon deficits, sorghum production shortfalls can exceed those of millet because it is more often planted at the lower end of its moisture-requirement range.

Livestock (cattle, small ruminants, and camels) represent both the primary wealth asset and the major source of income for the pastoralist and agropastoralist populations who account for approximately 40% of the Sahel's total population. El Niño-driven pasture depletion and water scarcity in 2026 will drive: accelerated and spatially extended transhumance (seasonal livestock movement), crowding traditional corridors and generating inter-communal conflict over access; distress sales of livestock as herd conditions deteriorate, crashing livestock prices and eroding household asset bases precisely when food prices are rising; and mortality events among weaker animals (young, lactating, and old animals die first), permanently reducing herd productivity.

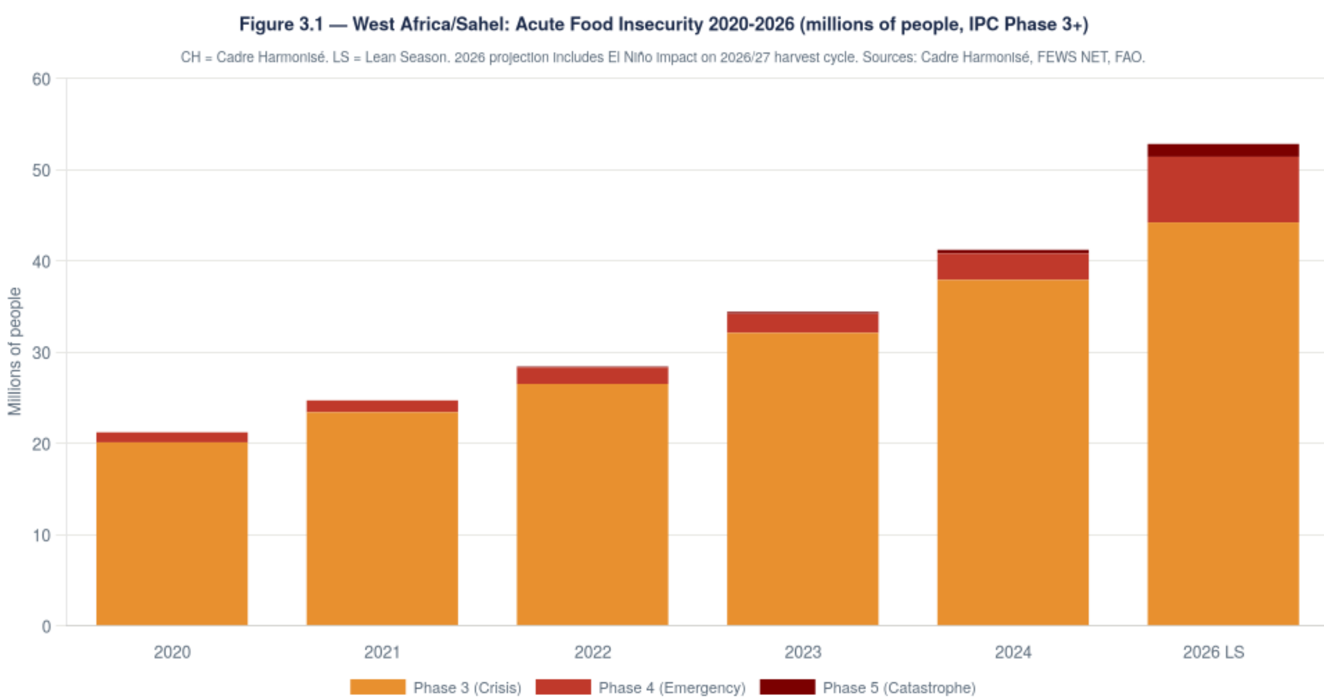

Figure 3.1: *West Africa and Sahel: Acute Food Insecurity 2020–2026 (millions of people, IPC Phase 3+). Stacked bars show Phase 3 (Crisis), Phase 4 (Emergency), and Phase 5 (Catastrophe) components. 2026 lean season projection includes El Niño signal on 2026/27 harvest cycle. Source: Cadre Harmonisé (2020–2026 assessments), FEWS NET (2026 projections).*

3.1.4 Country-Level Vulnerability Analysis

Country	IPC Phase 3+ (lean 2026)	El Niño Agricultural Risk	Key Crop at Risk	Critical Vulnerability Factor
Burkina Faso	~6.3M (Phase 3+); 1.4M Phase 4	CRITICAL, monsoon deficit + conflict = no fallback	Sorghum, cowpea	72 out of 145 communes with restricted humanitarian access; jihadist control of agricultural zones
Mali	~4.8M Phase 3+; 1.1M Phase 4	CRITICAL, Liptako-Gourma tri-border: compounded conflict-drought	Millet, rice (Niger River)	JNIM territorial control in Mopti, Ségou; market corridors blocked; Bamako-Gao axis insecure
Niger	~4.3M Phase 3+	HIGH, Agadez / Tahoua most exposed; pastoral system stressed	Millet, livestock	Post-coup suspension of EU/US development programs; reliance on Russian forces with no development mandate
Nigeria (NE/NW)	~25M Phase 3+	HIGH, combined Boko Haram / ISWAP conflict + monsoon variability	Maize, sorghum, millet	Largest absolute population at risk; Lake Chad Basin pastoral collapse; ISWAP food-system control
Chad	~4.0M Phase 3+	MODERATE-HIGH, Lake Chad watershed drying; Sahelian belt exposed	Sorghum, livestock	Lake Chad surface has shrunk 90% since 1960; any additional rainfall deficit is superimposed on structural collapse
Mauritania	~1.2M Phase 3+	HIGH (western Sahel strong monsoon suppression zone)	Millet, livestock, fisheries	High dependence on fisheries as food security buffer; fisheries also climate-sensitive
Senegal	~1.4M Phase 3+	MODERATE (stronger institutions; coastal fisheries buffer)	Millet, groundnut	Relatively strong government institutions; coastal fishing sector provides income buffer for non-farming households

Table 3.1: *West Africa and Sahel: Country-level food security status and El Niño exposure assessment. Sources: Cadre Harmonisé (Q1 2026), FEWS NET (June 2026), IPC Global Network.*

3.2 Southern Africa: From Crisis to Catastrophe Risk

3.2.1 Baseline: Still Recovering from 2023-24

Southern Africa enters the 2026 El Niño window in a severely weakened state, compounding the structural vulnerability of the upcoming 2026/27 rainy season with the residual impacts of the catastrophic 2023–24 drought. The 2024/25 SADC regional maize harvest of approximately 28.1 million metric tons (9% below the five-year average) reflects a recovery that is partial and uneven. Only South Africa and Tanzania achieved production surpluses; every other SADC state remained in deficit or recovery. The Kariba Dam, which provides hydropower to both Zambia and Zimbabwe, has not returned to its pre-2023–24 storage levels and remains vulnerable to a second consecutive poor rainy season.

Zimbabwe's situation is emblematic of the regional pattern. The government declared a national disaster on April 3, 2024, appealing for $2 billion in international assistance with approximately 6 million people food insecure. The 2024/25 agricultural season brought partial recovery (above-normal rainfall in some areas) but productivity was constrained by the depletion of household assets (livestock sold under duress in 2024, productive equipment liquidated, seed stocks depleted) and by the fiscal crisis that prevented government investment in agricultural support. The 2025/26 season was near-normal, but the household-level asset base remains far below its pre-2023–24 level.

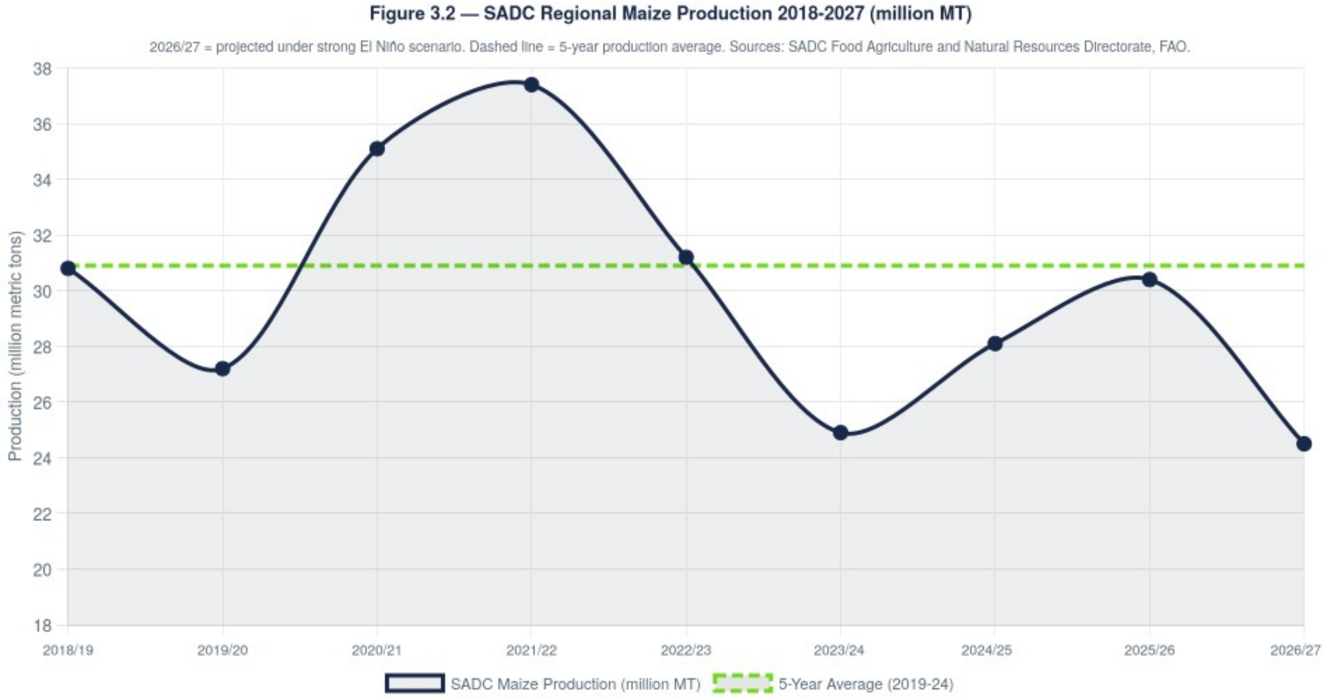

Figure 3.2: *SADC Regional Maize Production 2018/19–2026/27 (million metric tons). Dashed green line = 5-year production average (2019–24: 30.9M MT). 2026/27 projection assumes strong El Niño below-normal Southern Africa rainfall season (October 2026–March 2027). Sources: SADC Food Agriculture and Natural Resources Directorate; FAO GIEWS; FEWS NET.*

3.2.2 The Hydropower Cascades

The intersection of El Niño, hydropower dependency, and Southern African livelihoods warrants detailed treatment because it is often under-weighted in food security analyses that focus exclusively on crop production. Zambia generates approximately 83% of its electricity from hydropower, the vast majority from the Kafue and Kariba systems. During the 2023–24 El Niño drought, Kariba Lake storage fell to 7.7% of usable capacity by September 2024, the lowest level since the dam's construction in 1958. The operational consequences were severe and cascading:

- Daily load-shedding of up to 21 hours in Zambia, affecting all economic sectors from copper mining (Zambia's primary export and foreign-exchange earner) to food processing, refrigeration, and telecommunications;
- Forced shutdown of approximately 800 MW at Zimbabwe's Kariba North Bank power station, reducing available generation from 1,050 MW installed capacity to approximately 214 MW;
- Hospital operations disrupted; vaccine cold chains at risk; water pumping systems compromised; urban food markets unable to maintain refrigerated storage;
- Copper production losses from extended mine shutdowns, estimated at a reduction of approximately 15–20% of annual output from Zambia's Copperbelt;
- A multiplier effect on economic output estimated at 2–4% of GDP in direct and indirect losses (Zambia Economic Advisory, 2024).

A repeat of these conditions in 2026/27, which the current Kariba storage trajectory makes plausible if the 2026/27 austral summer is below-normal, would arrive before the reservoir has fully recharged. The Zambezi River Authority's monthly storage reports are the critical near-term monitoring indicator for this risk. If Kariba storage falls below 20% of usable capacity by November 2026, operators will face the same impossible choices as in 2024: reduce generation and accept economic shutdown, or maintain generation and risk irreversible damage to the turbines.

Country	El Niño Risk Rating	Projected IPC Phase (Oct 2026 – Jan 2027)	Primary Agricultural Impact	Critical Infrastructure Risk
Zimbabwe		Phase 3 (Crisis) in Matabeleland, Mashonaland	Maize, groundnut: >40% yield reduction (VS scenario)	Kariba North Bank hydro (1,050 MW installed); fuel import dependence; USD cash shortages
Zambia		Phase 3 across southern and eastern provinces	Maize, soybean: 30–50% yield reduction in deficit zones	Kariba South Bank / Kafue Gorge (3,777 MW total; Sept 2024 low: 1,040 MW operational); copper export revenue
Malawi		FEWS NET: Phase 3 (Crisis) in southern Malawi districts from Oct 2026	Maize: primary staple; tobacco: primary export	FX parallel premium >100%; food import financing at risk; limited irrigation
Mozambique		Phase 3 in southern provinces; variable center-north	Maize, cassava; southern cereal deficit	Cahora Bassa hydropower (2,075 MW); agricultural export revenue (sesame, tobacco)
Madagascar		Phase 3–4 in southern Madagascar (Grand Sud)	Rice, cassava, maize; southern region food crisis deepening	High cyclone exposure; limited state agricultural support capacity
South Africa	**MODERATE**	Phase 2 (domestic); major importer of vulnerable neighbors	Maize (Northern Cape, Limpopo): yield risk in key producing provinces	Lesotho Highlands Water Project: water supply to Gauteng at risk under severe drought; export food surplus at risk
Namibia / Botswana	**MODERATE**	Phase 3 in northern communal areas	Sorghum, millet, livestock; pasture depletion	Cattle export revenue; groundwater depletion in communal areas

Table 3.2: *Southern Africa: El Niño exposure and vulnerability assessment by country. Risk ratings: CRITICAL = Very Strong El Niño would likely trigger IPC Phase 4 (Emergency) conditions; HIGH = Widespread Phase 3 expected; MODERATE = Phase 3 in vulnerable sub-populations. Sources: FEWS NET, SAWS, SADC, ARC (June 2026).*

3.3 Horn of Africa and East Africa: The Bifurcated Season

The Horn of Africa's food security landscape entering 2026 reflects the cumulative weight of four consecutive below-normal rainy seasons between 2020 and 2024, compounded by the residual effects of the 2023–24 El Niño, ongoing conflict in Somalia, Ethiopia, and Sudan, and the structural fragility of East African food systems that depend on subsistence-level rain-fed agriculture for the majority of rural livelihoods. An estimated 20–25 million people in the Horn of Africa require food assistance as of mid-2026, a figure that predates any El Niño impact on the 2026 long rains.

Somalia presents the most acute convergence of El Niño exposure, conflict, and institutional collapse. IOM's DTM recorded approximately 62,000 new drought-induced displacements in early 2026 across five Somali districts, with drought accounting for three of every four new displacements, a 22% year-on-year increase. Global Acute Malnutrition (GAM) prevalence in crisis-affected zones reached 11–19% nationally and approximately 25% in IDP settlements in Galkacyo and Bossaso, well above the emergency threshold of 15%. Al-Shabaab controls approximately 40% of rural southern Somalia, levying taxes on agricultural produce, controlling market access, and exploiting the population's food dependence as a tool of territorial governance.

Ethiopia's situation is characterized by internal heterogeneity. The eastern and northeastern zones (Somali region, eastern Oromia, eastern Amhara, Tigray) face the highest drought exposure and carry the heaviest burden of cumulative multi-season deficit. The southwestern highlands have more reliable rainfall and stronger agricultural systems. The GHACOF May 2026 forecast assigns 60–80% probability of below-normal June–September long rains in the most vulnerable zones of northeastern Ethiopia, consistent with historical strong El Niño composites.

Sudan represents the most extreme case of climate-conflict interaction in the region. With 33.7 million people in need of humanitarian assistance: the largest national figure globally in the 2026 GHO, and a civil conflict that began in April 2023 having decimated agricultural systems in Darfur, Kordofan, and Blue Nile states, any additional El Niño-driven rainfall deficit carries catastrophic implications. Sudan is explicitly included in the FAO/WFP Joint Anticipatory Action Appeal.

The October–December 2026 short rains (Deyr/Hageya) represent the recovery potential. Historical patterns during positive IOD/El Niño co-occurrence suggest enhanced short rains in Somalia, Kenya, and eastern Ethiopia, a scenario that would provide recovery opportunity for bimodal cropping systems and improve pasture conditions for livestock. However, enhanced short rains in a degraded landscape, with soil structure weakened by multi-season drought, vegetation cover reduced, and water catchment infrastructure destroyed, carry serious flash-flood risk. The beneficial/harmful balance of enhanced short rains depends in practice on their intensity, spatial distribution, and timing.

3.4 South Asia: The India Price-Policy Nexus

India's importance to the 2026 El Niño food security analysis extends beyond its domestic population of 1.4 billion people. India is the world's largest exporter of rice (supplying approximately 40% of global rice trade in normal years), one of the largest wheat exporters, and a major source of sugar and pulses. Unilateral Indian trade policy responses to domestic supply concerns, as demonstrated by the July 2023 non-basmati white rice export ban, can amplify global food price spikes to degrees that affect the food security of populations in entirely different regions with no direct exposure to the Indian monsoon.

The India Meteorological Department (IMD) forecasts the 2026 southwest monsoon at 90% of the long-period average (LPA), with an 84% probability of below-normal or deficient seasonal rainfall. Cumulative rainfall through mid-June 2026 was 32% below normal nationally, with particularly large deficits in northwest India (-91%) and central India (-49%). However, India's buffer stock system, with record 2025/26 grain production of 376.6 million metric tons and substantial FCI wheat and rice reserves, provides a material domestic cushion. The risk is not famine in India; it is the policy response to rising domestic prices generating global supply-chain disruption.

Pakistan faces a more straightforwardly humanitarian El Niño risk. Below-normal monsoon rainfall, combined with pre-existing economic fragility (IMF program, high debt service costs exceeding 60% of fiscal revenue), limited irrigation system rehabilitation after the 2022 floods, and a rapidly urbanizing population with high food import dependence, creates conditions for acute food price transmission. Pakistan is explicitly listed among the 22 countries in the FAO/WFP Joint Anticipatory Action Appeal.

3.5 Southeast Asia: The September Onset

The primary El Niño impacts in Southeast Asia are expected to materialize from September–October 2026 onward, as the event's influence on the region's atmospheric circulation becomes fully established. The June–August period corresponds to the region's peak wet season in most areas, which typically provides adequate moisture even in El Niño years; the dry-season extension effect becomes dominant from September.

Indonesia faces wildfire risk in peat-rich Sumatra and Kalimantan, where the 2015–16 and 2019 El Niño events triggered transboundary haze events that blanketed Singapore, Malaysia, and southern Thailand and produced estimated regional economic losses of $2–3 billion each. Indonesia's record public rice reserves (approximately 5 million metric tons as of April 2026) provide a meaningful domestic food security buffer. Philippines rice production faces a projected 5–12% yield reduction based on historical El Niño event composites, and USDA projects Philippine rice imports could rise toward 5.1 million metric tons if domestic production declines materialize.

The FAO Food Price Index averaged 130.3 points in June 2026, essentially flat month-on-month at -0.3% but 2.2% above its June 2025 level and 18.4% below the record peak of 159.7 reached in March 2022. This comfortable headline number obscures a market that is simultaneously well-supplied at the aggregate level and exposed to tail risks that a single policy decision by a major exporter, or a single adverse meteorological development in a key producing region, could actualize within weeks. The March 2022 peak was itself the product of exactly this dynamic: the global cereal balance was tightly supplied going into early 2022, Russia's invasion of Ukraine on February 24 removed two major wheat and sunflower oil exporters from the market with 48 hours' notice, and within four weeks the FAO index had risen 12.6%. El Niño is not an invasion; its supply disruptions materialize over months rather than days. But the current market's apparent stability should not be read as resilience. It should be read as a market that has not yet priced the tail of the El Niño distribution into its forward expectations, partly because forward commodity markets are structurally poor at pricing low-probability high-consequence meteorological events until they are already developing, and partly because the current rice surplus from India, Thailand, and Vietnam provides a price buffer that could reverse rapidly if Indian policy or Southeast Asian production responds to the El Niño signal from September onward. The sub-index movements within the June 2026 FPI are more informative than the headline: the FAO All Rice Price Index rose 3.2% month-on-month in June, vegetable oils rose 3.8%, and sugar fell only modestly despite the El Niño supply concerns for India's cane crop. These movements are the market beginning to price El Niño risk, selectively, in the commodities most exposed to the specific teleconnection patterns forecast for 2026.

3.6 Central America Dry Corridor: Anticipatory Action Already Activated

The Central American Dry Corridor is the region where the humanitarian response system has advanced furthest in implementing the anticipatory action model in response to the 2026 El Niño. FAO's Agricultural Stress Index identified the Corridor as a high-priority zone in its initial June 2026 assessment, and the CERF approved a $4 million forecast-based financing disbursement in June 2026 when forecasts confirmed a below-normal June–August 2026 first-season rainfall.

This disbursement followed the first Latin American collective anticipatory drought plan, developed in 2025 by FAO, WFP, UNICEF, IOM, and national governments of Guatemala, Honduras, El Salvador, and Nicaragua, which defined specific meteorological trigger conditions and pre-agreed response activities for each level of rainfall deficit. The plan represents the most operationally advanced anticipatory action framework for El Niño response in any tropical region, and its activation in 2026 is a proof-of-concept for similar systems in the Sahel and Horn of Africa.

The food security baseline in Guatemala, where IPC analysis projects approximately 3 million people (one in six Guatemalans) in IPC Phase 3+ between February and April 2026, reflects both the structural poverty of the Dry Corridor and the residual impacts of prior droughts. White maize prices in Tegucigalpa were running 39% above the five-year average as of early 2026, sharply reducing household purchasing power for the bottom income quintile.

The migration dimension is analytically inseparable from the food security dimension in the Central American Dry Corridor. WFP surveys conducted during prior El Niño events found that 8% of Dry Corridor families explicitly planned to migrate externally as a coping strategy. For families at the margin of IPC Phase 3, the opportunity cost of remaining in a food-insecure community with limited livelihood alternatives is frequently lower than the expected gain from attempting migration, a rational livelihood calculation that no amount of border enforcement can eliminate without addressing the underlying food security condition.

3.7 Caribbean and Haiti: Compound Vulnerability Extreme

Haiti is the most severe food security crisis in the Western Hemisphere and one of the most acute globally. As of the April 2026 IPC analysis: the most recent available, 5.83 million Haitians, representing 52% of the national population, were in IPC Phase 3 (Crisis) or above, including more than 1.8 million in Emergency (IPC Phase 4). An estimated 1.3 million Haitians are internally displaced by armed gang violence, which by 2026 controls approximately 90% of the Port-au-Prince metropolitan area.

Haiti's analytical position in this report requires a careful statement of causation. The primary drivers of Haiti's crisis are structural: the combination of political collapse following the July 2021 assassination of President Moïse, the progressive expansion of armed gang territorial control (particularly the G9 coalition and its successor structures), extreme economic fragility (GDP per capita approximately $1,800 at purchasing power parity; formal employment below 15% of the working-age population), and the structural underdevelopment of the agricultural sector (less than 20% of potentially arable land under cultivation due to deforestation, soil erosion, and insecurity). El Niño is a compounding factor, not a primary driver, in Haiti's case.

El Niño historically suppresses Atlantic hurricane activity by increasing upper-level wind shear over the main development region, a characteristic that, if it holds for 2026, would provide some protection during the June–November 2026 hurricane season. However, this is a probabilistic association, not a guarantee; a single major hurricane landfall in Haiti during an active season would represent a catastrophic additional shock to a system already in near-terminal distress.

3.8 Cross-Regional Vulnerability Synthesis

The seven regional analyses above reveal structural patterns that transcend geography and define the nature of the 2026 El Niño challenge:

Pattern 1: The Compounding Crisis. The 2026 El Niño does not strike neutral communities. It strikes communities whose agricultural and livelihood systems are already severely disrupted by armed conflict, displacement, and governance failure, whose herd sizes are 40-60% below pre-2020 levels in the Horn of Africa, whose soil fertility has declined from three to four consecutive years of below-normal rainfall without the recovery period that normal ENSO cycling would provide, and whose household asset bases have been depleted through a sequence of distress sales, forced migration financing, and failed harvests that began in 2020 and has not ended. The implication is not merely that the 2026 El Niño is bad news for populations already in difficulty. The implication is that the vulnerability multiplier between a given meteorological El Niño intensity and its humanitarian outcome has increased dramatically since 2019. A strong El Niño hitting the Horn of Africa in 2012, when livestock herds were closer to normal and household assets were partially recovered from the 2010-11 crisis, would have produced different outcomes than the identical meteorological event hitting the Horn in 2026. The scientific community has a term for this: compound risk. Two independent risk factors occurring simultaneously produce outcomes that exceed the sum of their individual effects because each one removes the buffers that would have allowed adaptation to the other. The 2026 El Niño is not an isolated event. It is the latest in a cascade of compounding shocks for which the affected populations have run out of buffers.

Pattern 2: The Asset Depletion Spiral. Extended droughts destroy the productive asset base of rural households, livestock, equipment, seed stocks, land improvements, which reduces their capacity to recover even when rainfall returns to normal. Each successive El Niño event, therefore, strikes a population with less productive capacity than the previous event did. This progressive asset depletion explains why the 2023–24 "Strong" El Niño produced humanitarian outcomes in Southern Africa comparable to the 2015–16 "Very Strong" event: the population's capacity to absorb shock had deteriorated, not improved, in the intervening decade.

Pattern 3: The Urban Transmission Vector. El Niño's agricultural impacts are typically analyzed in terms of rural households and subsistence farmers. Increasingly, however, they reach urban populations through food price transmission, a mechanism that is underweighted in most food security analyses but is growing in importance as African urbanization accelerates. The urbanization rate in Sub-Saharan Africa now exceeds 4% per year in many countries, meaning that the share of the population exposed to food price transmission rather than direct agricultural production shortfall grows with every passing season. In 2026, African cities that have grown rapidly in the past two decades have large populations of urban poor, people who spend 50-70% of household income on food and who have no agricultural production to fall back on when markets fail. A 30-40% increase in staple food prices, well within the range produced by previous strong El Niño events, can push millions of urban poor into acute food insecurity that is both more politically salient, because it is visible to governments and media in capital cities, and more difficult to address with agricultural support programs that are designed for rural production systems. The 2023-24 El Niño produced urban bread riots and food price protests in Zambia, Zimbabwe, and parts of West Africa that received far less attention in food security reporting than the rural production shortfalls that drove them. The urban food insecurity channel also has a security dimension that parallels the rural conflict nexus: urban youth unemployment and food insecurity are documented recruitment environments for both criminal gangs and, in the case of coastal West Africa, for the jihadist organizations expanding southward from the Sahel.

Pattern 4: The Governance Interaction. The regions most exposed to El Niño's agricultural teleconnections are disproportionately governed by states with limited fiscal capacity, constrained institutional effectiveness, and in some cases active domestic political crises (military governments in Mali, Burkina Faso, Niger; civil war in Sudan; political instability in Zimbabwe) that reduce the government's ability and political incentive to prioritize food security programming. The international community's ability to fill this governance gap through humanitarian assistance is, in turn, constrained by the worst funding environment in a decade.

CHAPTER 4

4. Global Food Price Dynamics and Commodity Markets

4.1 Market Baseline: Relative Calm Before the Storm

The global food commodity market environment in June–July 2026 presents a paradox that requires careful interpretation. By the headline indicator, the FAO Food Price Index (FPI), the most widely cited composite measure of international food commodity prices, markets appear broadly stable and well-supplied. The June 2026 FPI averaged 130.3 points (2014–2016 = 100), only 2.2% above its year-earlier level and fully 18.4% below the historical peak of 159.7 reached in March 2022 in the aftermath of Russia's invasion of Ukraine. Global cereal production for 2026 is forecast at 2,983 million metric tons, the second-highest on record despite being 1.9% below 2025's historical maximum. The global cereal stock-to-use ratio: the most important single indicator of medium-term price risk, remains a comfortable 32%, well above the 20–25% levels that have historically preceded acute price crises.

This comfortable aggregate picture masks substantial commodity-specific and region-specific divergences that are both currently visible and likely to intensify as El Niño peak impacts materialize. Three commodity sub-indices in the June 2026 FPI release are already moving in the direction that El Niño risk analysis would predict: the FAO All Rice Price Index rose 3.2% month-on-month; vegetable oils (primarily palm oil) rose 3.8%; and sugar fell only modestly (–5.7%) from elevated levels, with market participants noting El Niño-related concerns for the 2026/27 Indian and Thai cane crops as a support factor.

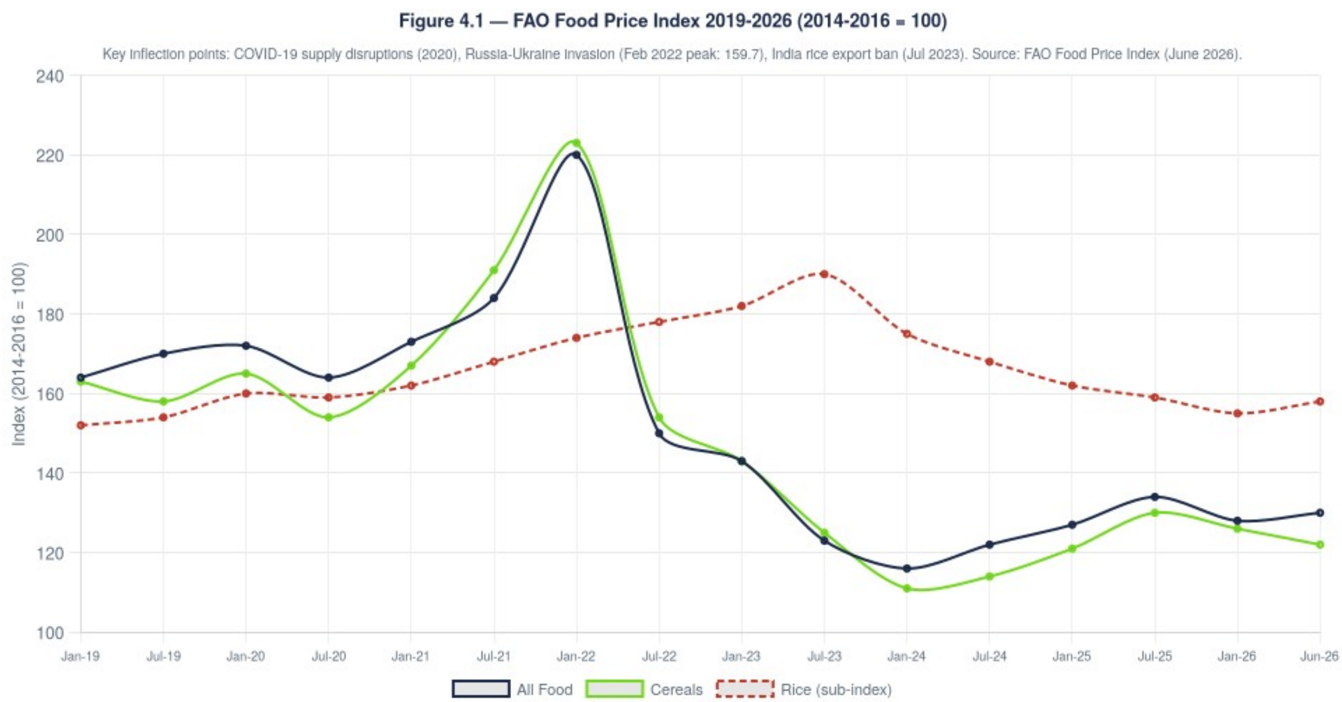

Figure 4.1: *FAO Food Price Index 2019–2026 (2014–2016 = 100). All Food (navy), Cereals (green), Rice sub-index (red dashed). Key inflection points: COVID-19 supply disruptions (2020); Russia-Ukraine invasion (February 2022 peak: 159.7); India rice export ban (July 2023). Source: FAO Food Price Index, monthly releases 2019–June 2026.*

4.2 Rice: The Primary El Niño Commodity Risk

Rice is, by serious margin, the most El Niño-sensitive of the globally traded staple cereals. The combination of India's dual role as the world's largest rice exporter (approximately 40% of global trade) and one of the El Niño's primary agricultural impact zones, combined with the geography of other major rice exporters (Thailand, Vietnam, Myanmar) in El Niño-sensitive Southeast Asia, means that any strong El Niño event creates simultaneous supply pressure across the dominant suppliers to the global rice market.

The 2023 precedent is analytically essential. India's July 20, 2023 ban on non-basmati white rice exports, motivated by a below-normal monsoon in June–July 2023 and rising domestic rice prices, removed approximately 10 million metric tons of annual export supply from global markets with less than 24 hours' notice. The FAO All Rice Price Index responded by reaching its highest level since 2011 within six weeks. Some Indica benchmark prices (Thai 5% broken rice, the primary reference for the African and Middle Eastern import market) rose by up to 40% between July and November 2023, before progressively easing as it became clear that Indian production would not fall as severely as feared and as India progressively lifted restrictions through late 2024.

The structural conditions in 2026 that could trigger a repetition of this episode are: a confirmed below-normal Indian monsoon (currently forecast at 90% of LPA, below-normal by definition); politically sensitive domestic rice price inflation ahead of potential regional elections; and a government that has already demonstrated willingness to prioritize domestic price management over export market stability. The political economy of rice price management in India, where food price inflation is one of the most electorally sensitive issues, creates structural incentives for defensive trade policy that the formal G20 commitment to avoiding export restrictions (under the AMIS framework) has not consistently been able to override.

The World Bank's June 2026 Commodity Markets Outlook assigned a 61–87% probability of a "strong or very strong El Niño emerging by mid-2026" and found that this scenario could cut rice output by 20–50% in the most affected regions of South Asia, Southern Africa, and parts of East Asia. This range is wide enough to encompass outcomes from moderate market stress to severe global price crisis; the key swing variables are the Indian monsoon trajectory and the Government of India's trade policy response.

Adding to the complexity: the current global rice market is actually well-supplied by historical standards. After the 2023 crisis, India's 2024/25 rice harvest was strong, restrictions were lifted, and both Thailand and Vietnam ramped up exports, creating a global surplus that has kept prices below their 2023 peak. This surplus functions as a buffer, but one whose effectiveness depends on it remaining intact rather than being reabsorbed into national strategic reserves if El Niño-related concerns intensify trade policy anxiety.

4.3 Wheat: Resilient But Not Immune

Wheat markets are currently well-supplied, with the June 2026 FAO Wheat Price Index falling 4.4% month-on-month on strong Black Sea export competition from Ukraine and Russia. El Niño's wheat exposure operates through two geographically distinct channels: Australian winter wheat (planted May–June, harvested November–December) faces below-normal rainfall risk in the southern grain belt of Western Australia, South Australia, and Victoria, zones that are highly sensitive to the El Niño dry signal; and Indian wheat faces risk from sub-optimal monsoon conditions that reduce soil moisture ahead of the rabi (winter-sown) planting season in October–November.

Australia is the world's fifth-largest wheat exporter and a critical supplier to Middle Eastern and Southeast Asian markets. The 2002–03 and 2019 El Niño events both produced major Australian wheat production shortfalls (–37% and –27% respectively in the most affected seasons). The 2026/27 Australian wheat crop (planted in May–July 2026) will develop in conditions of confirmed El Niño influence on the southern grain belt from approximately September onward. IMF and FAO forecasters currently project Australian wheat production at approximately 24 million metric tons for 2026/27, down from 28 million in 2025/26, reflecting the El Niño risk. This reduction is not catastrophic at the global scale given abundant Northern Hemisphere wheat supplies, but it narrows the global buffer for price shock absorption.

4.4 Sugar, Palm Oil, and Cocoa: High-Sensitivity Commodities

Three commodity markets beyond the major cereals face particularly elevated El Niño exposure: sugar (through India and Thailand's cane crops), palm oil (through Indonesia and Malaysia's dry-season production), and cocoa (through West Africa's climate sensitivity).

Global sugar markets experienced material price volatility in 2023–24 partly due to El Niño concerns about India's cane production, which is highly sensitive to the southwest monsoon. A repeat of a below-normal Indian monsoon in 2026, combined with concerns about the 2026/27 Thai cane crop and reduced crushing season throughput, represents a meaningful upside price risk for sugar markets that are already recovering from the 2023 spikes.

Palm oil, of which Indonesia and Malaysia together supply approximately 85% of global traded volumes, faces reduced production risk from the dry-season extension associated with El Niño in the Maritime Continent. Historical El Niño events have reduced Indonesian palm oil output by 5–15% in the following year, with a lag of approximately 12–18 months from the meteorological event to the production impact (reflecting palm oil's delayed phenological response). A strong 2026 El Niño would thus be expected to reduce Indonesian palm oil production in approximately 2027, compounding the immediate price pressure from wildfire-related operational disruptions in 2026.

West African cocoa, produced primarily in Côte d'Ivoire (approximately 40% of global output) and Ghana (approximately 20%), has been in a multi-year crisis since the 2022–23 season due to drought, disease (cocoa swollen shoot virus), and aging tree stock. A below-normal 2026 Sahel monsoon extends drought pressure into the cocoa-growing zones of the humid forest margins, further stressing production capacity in countries that are already responding to historically high cocoa prices driven by supply deficit. The structural dynamics of the West African cocoa supply chain, which would require 5–7 years of investment in replanting and disease management to recover even under favorable conditions, mean that El Niño's 2026 contribution to the cocoa supply shortfall is likely to persist well beyond the event itself.

4.5 Trade Policy Risk: The Export Restriction Contagion

One of the most important (and most systematically underestimated) mechanisms by which El Niño transmits to global food insecurity is the cascade of export restrictions that major producing countries implement to protect domestic consumers when production is threatened. This mechanism was extensively documented during the 2007–08 food price crisis (when approximately 30 countries implemented export restrictions), during the COVID-19 pandemic (when more than 20 countries restricted food exports in 2020), and most recently during the 2023 India rice ban.

The fundamental problem with export restrictions is that they are nationally rational in isolation and globally destructive in aggregate. When India bans rice exports to protect domestic consumers from rising prices, the immediate domestic effect is to stabilize prices for Indian consumers. The immediate international effect is to remove supply from global markets precisely when demand is rising, amplifying the price spike for importing countries, often the most food-insecure countries that can least afford the additional cost. When multiple countries implement restrictions simultaneously, the amplification effect is multiplicative.

The formal institutional framework for preventing export restriction contagion is the G20 Agricultural Market Information System (AMIS), established in 2011 following the 2010–11 food price crisis. AMIS provides near-real-time monitoring of global supply and demand for the four major traded cereals and coordinates policy dialogue among G20 agricultural ministers. However, AMIS's authority is purely advisory; it has no legal standing to prevent member states from implementing export restrictions, and its track record in preventing the India 2023 ban, despite India's formal participation in AMIS governance, demonstrates the limits of non-binding coordination mechanisms when domestic political pressures are sufficiently intense.

ISDO recommends, in the Policy Recommendations chapter, that the G7 and G20 convene an emergency agricultural trade ministers' meeting before November 2026 to secure a collective standstill declaration against staple food export restrictions, with explicit acknowledgment that the 2023 India precedent has made the AMIS framework's informal norms insufficient as a crisis prevention mechanism. The legal instrument best suited to formalizing such a commitment remains under debate in WTO/agricultural trade circles, but the political commitment is achievable and worth pursuing regardless of the legal mechanism.

4.6 Historical Price Analysis: Three Event Comparisons

El Niño Event	Niño 3.4 Peak	Peak Global Rice Price Change	Peak Global Wheat Price Change	Peak Global Maize Price Change	Key Trigger Mechanism
1997-98	+2.4°C	+22% (Thai Indica)	+28% (Chicago)	+24%	SE Asia drought; Indonesia fires; Australia shortfall
2015-16	+2.3°C	+8% (moderate; USD strong)	+5% (minimal)	+12%	Southern Africa maize deficit; Australia shortfall; Black Sea oversupply limited spike
2023-24	+1.9°C	+40% (Indica Jul–Nov 2023)	+3% (Black Sea supply absorbed)	+8%	INDIA RICE EXPORT BAN (Jul 2023): primary market mechanism; underlying India monsoon deficit moderate
2026 (Scenario B)	+1.6°C (est.)	+15–25% projected	+5–12% projected	+12–22% projected	India below-normal monsoon; SE Asia dry season; SA maize deficit; potential India policy response
2026 (Scenario C)	+2.0°C+ (est.)	+30–45% projected	+10–20% projected	+20–35% projected	Multiple simultaneous supply shocks; India ban probable; SE Asia production collapse; SA emergency imports

Table 4.1: *Historical and projected food commodity price changes during major El Niño events. Historical figures represent peak changes from pre-event baseline to event peak. 2026 projections represent ISDO central estimate ranges under Scenarios B and C. Sources: FAO Food Price Index, NOAA, World Bank Commodity Markets Outlook, historical commodity trade databases.*

4.7 Fertilizer and Input Cost Compounding Factors

Food commodity price analysis that focuses exclusively on end-product prices misses a second mechanism by which El Niño affects food security: the impact on input costs, particularly fertilizers, and the resulting effect on planting decisions and yield per hectare in the following season.

The World Bank projects global fertilizer prices to rise approximately 31% on average in 2026, reaching their least affordable levels since the 2021–22 crisis that preceded the Ukraine invasion. The drivers include: elevated natural gas prices (the primary feedstock for nitrogen fertilizer); higher ammonia prices linked to Middle East conflict impacts on production in Egypt and other regional producers; increased freight costs; and supply concentration in producers subject to geopolitical risk (Russia, Belarus, China). A strong El Niño that reduces agricultural income in affected regions, particularly in Sub-Saharan Africa and South Asia, simultaneously reduces farmer ability to purchase inputs for the following season, compounding the direct yield loss of the El Niño event itself with reduced fertilizer application that constrains the recovery season's productivity.

This input-cost channel is one of the mechanisms through which Callahan and Mankin (2023) found that El Niño's economic impacts are "persistent" rather than transient: the damage to agricultural productivity in year one of the event cycle reduces fertilizer use, seed quality investments, and equipment maintenance in the following season, creating a multi-year productivity depression that outlasts the meteorological event by three to five years.

3.9 The Sahel in Depth: Livelihood Systems Under Compound Stress

3.9.1 The Agropastoral Transition Zone

The Sahel is not a single agricultural system but a mosaic of livelihood zones that respond differently to rainfall variability. Understanding this heterogeneity is essential for designing targeted interventions. FEWS NET's livelihood zone mapping for West Africa identifies at least seven distinct systems across the Sahel belt, each with characteristic food security dynamics and El Niño vulnerability.

The northern pastoral zone, stretching across the driest portions of Mauritania, Mali, Niger, and Chad (roughly 100-300mm annual rainfall), is populated almost exclusively by mobile pastoralists who keep cattle, camels, and small ruminants. These communities have historically managed rainfall variability through extensive mobility, moving herds to wherever rain and pasture are available across seasonal transhumance routes that may cover 500-1,000 kilometers. El Niño's primary threat to this zone is not crop failure (there are no crops) but pasture depletion and water point failure. When the June-August monsoon is weak and delayed, the savanna grasses that normally green up in June-July remain brown and unproductive, forcing early southward movement that crowds the more productive agropastoral zones and triggers inter-communal resource competition.

The agropastoral transition zone (300-600mm annual rainfall), covering the core of the Sahel from Senegal through Niger, combines rain-fed millet and sorghum cultivation with extensive livestock keeping. Roughly 60% of households in this zone derive income from both crops and livestock, and the interaction between the two is crucial for resilience. In good years, crop residues provide supplementary fodder for livestock after harvest; crop sales provide cash to purchase additional livestock or to pay for veterinary care; and livestock provide traction for land preparation and organic fertilizer for fields. In drought years, this integration breaks down: crop failures leave no residues, forcing earlier and deeper drawdown of stored fodder; livestock are sold or die, removing the productive asset base for the following season; and cash income from both crop sales and livestock sales collapses simultaneously.

The Sudano-Guinean zone (600-1,000mm annual rainfall), covering the southern margins of the Sahel in Senegal, southern Mali, and southwestern Burkina Faso, is better-adapted to rainfall variability but still exposed to the El Niño-driven monsoon suppression that reduces early-season rainfall and extends the dry season. This zone produces the majority of cotton, groundnut, and sorghum exports in the Sahel states and is therefore particularly important for government fiscal revenue, which is further stressed by any El Niño production decline.

3.9.2 Pastoral Calendar and Vulnerability Windows

The pastoralist and agropastoralist vulnerability to El Niño in the Sahel is strongly time-structured. The following calendar maps the key vulnerability windows against the expected 2026 El Niño signal:

Period	Normal Activity	El Niño Impact (2026)	Risk Level	Early Warning Indicator
Apr–May 2026	Pre-rains: herd movement north; crop land preparation	Delayed onset forecast already signaling deficit; farmers uncertain on planting timing	HIGH	NDVI anomaly; first-rain date vs. climatology
Jun–Jul 2026	Monsoon onset; planting window; pasture green-up	Monsoon suppression: delayed onset, reduced totals; missed planting window for millet	CRITICAL	Dekadal CHIRPS rainfall anomaly; market price of millet seed
Aug 2026	Peak growing season; livestock on northern range	Pasture depletion forces early southward return; crop stress if dry August	HIGH	NDVI vs. LTA; herd condition reports from DTM

Period	Normal Activity	El Niño Impact (2026)	Risk Level	Early Warning Indicator
Sep–Oct 2026	Harvest; livestock return to agropastoral zone	Below-average harvest; crowding of ranges; livestock prices collapse on distress sales	CRITICAL	Cadre Harmonisé post-harvest update; livestock price index
Nov 2026–Jan 2027	Lean season begins; crop stocks from harvest	Rapid stock depletion due to low harvest; lean season starts 2-3 months early	CRITICAL	HEA food consumption deficit; market maize price anomaly
Feb–May 2027	Deep lean season; preparation for next rains	2027 lean season likely to exceed 2026: depleted stocks, depleted assets, no buffer	CRITICAL	IPC update; acute malnutrition rates (MUAC screening)

Table 3.3: *Sahel pastoralist and agropastoralist vulnerability calendar for the 2026 El Niño event cycle, with early warning indicators. NDVI = Normalized Difference Vegetation Index; LTA = Long-Term Average; CHIRPS = Climate Hazards Group InfraRed Precipitation with Station data; DTM = IOM Displacement Tracking Matrix; HEA = Household Economy Approach; MUAC = Mid-Upper Arm Circumference. Sources: FEWS NET, Cadre Harmonisé, IOM DTM, FAO GIEWS.*

3.9.3 The Lake Chad Basin: A System at the Edge

The Lake Chad Basin deserves separate treatment as the most ecologically degraded El Niño-sensitive system in the Sahel. Lake Chad, which once covered approximately 25,000 square kilometers and supported the livelihoods of an estimated 30 million people, had shrunk to roughly 2,500 square kilometers by 2020. The lake's dramatic reduction, driven by a combination of reduced rainfall (the 1970s Sahelian droughts), increased irrigation withdrawals from the Chari and Logone rivers, and population growth in the basin, has fundamentally restructured the agricultural and pastoral economies of the four-state basin (Niger, Nigeria, Cameroon, Chad).

El Niño's impact on the Lake Chad Basin operates through two channels. The first is the monsoon suppression channel described above, which reduces both direct rainfall on the lake and the runoff from the southern catchments that provides the majority of the lake's inflow. A below-normal 2026 monsoon would further reduce the lake's surface extent and the availability of receding flood plain agriculture (polders), which provides food for an estimated 4-5 million people in the northeastern Nigeria and western Chad portions of the basin.

The second channel is the conflict channel. The Lake Chad Basin is the epicenter of the Boko Haram / ISWAP insurgency, which has displaced approximately 2.5 million people and destroyed agricultural infrastructure across the northeastern Nigeria, northern Cameroon, western Chad, and southeastern Niger portions of the basin. The combination of conflict-driven displacement, restricted market access, and El Niño-driven agricultural stress creates a compounding crisis in which the most food-insecure populations are simultaneously those least able to migrate to alternative sources of support and those least accessible to humanitarian assistance due to security restrictions.

Approximately 25 million people in northeastern Nigeria and the Lake Chad Basin already face IPC Phase 3 or above conditions. The ISWAP insurgency has demonstrated its capacity to exploit food insecurity for recruitment and territorial expansion: communities whose agricultural systems have failed and whose humanitarian assistance has been blocked by security conditions are precisely the communities that ISWAP targets with food provision as a "governance" tool. The interaction between the Lake Chad ecological collapse, ISWAP territorial ambitions, and El Niño rainfall deficits in 2026 represents the most acute convergence of climate, conflict, and governance failure in the entire Sahel region.

3.10 Southern Africa in Depth: The Multi-Season Stress Architecture

3.10.1 The SADC Food System: Structural Characteristics

The Southern Africa Development Community (SADC) regional food system has three structural characteristics that shape its response to El Niño: the dominance of maize as a staple crop, the heavy dependence on rain-fed rather than irrigated production in most member states, and the regional heterogeneity in agricultural capacity that makes intra-regional food trade both possible and necessary.

Maize covers approximately 60-70% of total cereal area in Zimbabwe, Zambia, Malawi, Mozambique, and Lesotho, and 40% in South Africa and Tanzania. This degree of crop concentration on a single species is itself a structural vulnerability: a single climatic event that adversely affects maize production affects the food security of the entire population simultaneously. Drought-tolerant varieties (DTMA varieties from CIMMYT/IITA) have been progressively introduced across the region since 2010, but adoption rates remain below 40% in most countries outside South Africa, partly due to seed system constraints and partly due to the higher cost of improved seed relative to traditional varieties.

The reliance on rain-fed agriculture means that El Niño's suppression of October-March rainfall directly translates into reduced crop production without the buffer that irrigation would provide. South Africa's Limpopo and North West provinces, which produce a large share of South African maize, have irrigation infrastructure covering roughly 15% of crop area, providing some buffer. Zambia, Zimbabwe, and Malawi have irrigation coverage below 5% of crop area, meaning that virtually all production is directly weather-dependent.

South Africa's role as the region's largest maize producer and exporter provides a critical buffer for neighboring deficit countries in non-El Niño years. South Africa's 2025/26 maize production of approximately 16.5 million metric tons placed it in strong surplus, allowing exports to Zimbabwe, Zambia, and other deficit countries. However, South Africa's own El Niño exposure, particularly in the northern provinces, means that a very strong 2026/27 El Niño could simultaneously reduce South African production and eliminate the surplus available for regional trade.

3.10.2 Country-by-Country Production Scenarios, 2026/27

Country	2025/26 Production (MT)	Scenario B: Strong El Niño	Scenario C: Very Strong El Niño	Domestic requirement (MT)	Implied gap (Scenario C)
South Africa	16.5M	13.2M (−20%)	11.6M (−30%)	~11.5M	~0.1M deficit
Zambia	3.4M	2.4M (−30%)	1.7M (−50%)	~3.2M	~1.5M deficit
Zimbabwe	1.6M	1.0M (−38%)	0.7M (−56%)	~1.8M	~1.1M deficit
Malawi	3.7M	2.8M (−24%)	2.1M (−43%)	~3.5M	~1.4M deficit
Mozambique	2.3M	1.8M (−22%)	1.4M (−39%)	~2.4M	~1.0M deficit
Tanzania	6.2M	5.4M (−13%)	4.8M (−23%)	~4.8M	~0 (in balance)
SADC TOTAL	**~33.7M**	**~26.6M (−21%)**	**~22.3M (−34%)**	**~27M**	**~4.7M regional deficit**

Table 3.4: *SADC maize production scenarios for 2026/27 under Strong and Very Strong El Niño. Production projections based on ISDO analysis applying historical El Niño rainfall impact coefficients from SADC FANR Vulnerability Assessment Committee (VAC) methodology to 2025/26 production baseline. Percentage reductions derived from 2015-16 and 2023-24 SADC event impact assessments scaled to forecast intensity. Sources: SADC FANR, USDA WASDE, FAO GIEWS.*

3.10.3 Gender and Age Dimensions of Food Insecurity

El Niño's food security impacts are not distributed uniformly across households or demographic groups. Women and children are consistently found to bear disproportionate burdens during drought-driven food crises, a pattern that holds across all the regions analyzed in this report but is particularly acute in Southern Africa and the Sahel.

Women's disproportionate burden operates through several mechanisms. In most SADC and Sahel agricultural systems, women are the primary producers of household food crops while men are more involved in cash crop production. El Niño's reduction of rainfall disproportionately affects the food crops grown on household plots (typically in marginal, less-irrigated land) relative to cash crops (typically on better land or with supplemental irrigation). Women are therefore the primary labor absorbers of the shock in terms of additional work to manage depleted water sources, search for wild foods, and care for malnourished children, while simultaneously bearing reduced nutritional status themselves due to intrahousehold food allocation patterns that typically favor adult men and boys.

Children under five face the highest mortality risk from drought-driven malnutrition, particularly wasting (acute malnutrition), which responds most directly to short-term food availability shocks. The 2023-24 El Niño produced Global Acute Malnutrition (GAM) rates exceeding 20% in the most affected districts of Zambia and Zimbabwe, well above the 15% emergency threshold. Under a Scenario C 2026 event, with production deficits of 40-50% in the most exposed districts, GAM rates could approach or exceed the levels seen in the worst months of the 2023-24 crisis.

Older people, particularly in households where adult working-age members have migrated to cities or abroad, represent another category of disproportionate vulnerability. Rural households where remittances from urban migrants provide the primary cash income face a double exposure when El Niño simultaneously reduces crop production (the subsistence component) and reduces urban employment opportunities (reducing remittances).

3.11 The Horn of Africa in Depth: Five Consecutive Crises

3.11.1 The Cumulative Drought Record, 2020-2026

No other region in the world has experienced the sustained drought frequency of the Greater Horn of Africa between 2020 and 2026. The standard IPC analysis tracks acute food insecurity at a point in time; what it cannot fully capture is the cumulative livelihood destruction that occurs when successive below-normal rainy seasons hit the same populations before they have recovered from the previous event.

The Horn experienced five serious drought episodes in six years: the 2020-22 extended drought across northern and eastern Ethiopia, Eritrea, and Djibouti; the 2021-22 failed Deyr (short rains) in Somalia, the worst in 40 years by some accounts; the 2022-23 fourth consecutive below-normal rainy season across the Horn, bringing conditions to the edge of famine in southern Somalia; the 2023-24 El Niño event, which despite its enhanced-rainfall (positive IOD) impact on the short rains caused devastating long-rain deficits in Ethiopia and Uganda; and the 2025-26 below-normal long rains that preceded the current assessment.

The cumulative effect of these successive events is a systematic destruction of the productive asset base of rural households across the region. Livestock herds, which typically represent 70-80% of pastoralist household wealth, have been reduced by an estimated 40-60% from their pre-2020 levels in the most affected agropastoral zones of Ethiopia's Somali Region, Oromia, and parts of northern Kenya. Rebuilding a herd from a nucleus requires years of favorable conditions; with El Niño threatening another below-normal long-rain season in June-September 2026, the prospect of beginning recovery is now delayed by at least another full year for the most affected communities.

3.11.2 Al-Shabaab Control and Humanitarian Access

The food security analysis for southern Somalia cannot be conducted without explicit treatment of the humanitarian access constraints imposed by Al-Shabaab territorial control. As of June 2026, Al-Shabaab controls or actively contests approximately 40% of southern Somalia's rural territory and has demonstrated a consistent pattern of blocking humanitarian assistance delivery, taxing aid convoys, and deliberately targeting the infrastructure of food assistance programs.

The most documented tactic is the interdiction of food assistance convoys at checkpoints in areas under Al-Shabaab influence. The UN Panel of Experts on Somalia has documented multiple cases in which Al-Shabaab demanded "taxes" of 10-20% of food deliveries in exchange for safe passage, effectively diverting humanitarian resources to the armed group. Where payment was refused, convoys were detained, drivers threatened, or vehicles destroyed. This creates a systematic bias in humanitarian coverage: the most food-insecure communities, located in Al-Shabaab-controlled or contested areas, are also the least accessible to conventional food assistance programming.

The Federal Government of Somalia (FGS) and ATMIS forces have made documented gains in recent counterinsurgency operations, recovering portions of the Middle Shabelle and Lower Shabelle regions. These gains improved humanitarian access to some previously inaccessible communities during 2024-25. However, Al-Shabaab has demonstrated resilience in the face of territorial setbacks by dispersing fighters, maintaining covert networks in recovered areas, and conducting high-profile attacks in Mogadishu to signal continued capability. Under El Niño conditions that intensify population displacement toward accessible urban areas, the risk that Al-Shabaab reconstitutes presence in evacuated rural areas is real.

3.11.3 The India Ocean Dipole Recovery Scenario

As noted in the main body of Chapter 3, a positive Indian Ocean Dipole co-occurring with the 2026 El Niño would tend to produce enhanced October-December short rains in Somalia, Kenya, and eastern Ethiopia, offering potential partial compensation for the June-September long-rain deficit. This scenario warrants careful analysis because it is frequently oversimplified in media coverage as "El Niño brings drought to East Africa" without accounting for the seasonal bifurcation.

Three aspects of the IOD recovery scenario deserve particular attention for food security planning. First, enhanced short rains do not undo the damage of a failed long-rain season for long-cycle crops like maize and sorghum, which have already failed or been missed by the time the short rains arrive. The short-rain benefit is most relevant for short-cycle crops like cowpea and green gram planted in September-October, for pasture recovery, and for replenishment of household water reserves.

Second, enhanced short rains carry serious flood risk in already-degraded landscapes. Repeated drought cycles compact soils, reduce vegetative cover, and accelerate runoff, meaning that the same rainfall amount produces higher flood peaks and more erosion in a drought-degraded landscape than in a healthy one. The October-November 2023 floods in Kenya and Somalia, which occurred during the enhanced short rains of the 2023-24 El Niño/positive IOD event, killed more than 200 people and displaced more than 300,000, demonstrating that the IOD recovery scenario carries its own humanitarian risks.

Third, the probability of a positive IOD in 2026 is not yet well-constrained in the June 2026 forecast. ECMWF assigns roughly equal probability to neutral and positive IOD conditions for the July-November period, meaning the short-rain recovery scenario should be treated as a possibility rather than a probability.

3.12 South Asia in Depth: The India Trade Policy Nexus

3.12.1 The 2023 Rice Export Ban: A Detailed Post-Mortem

Understanding why India's July 2023 rice export ban produced such severe global market impacts requires examining both the mechanics of the ban itself and the structural features of global rice trade that made India's unilateral action so consequential.

India had been the world's largest rice exporter since 2012, supplying an average of 17-22 million metric tons of rice per year to global markets across the 2015-2022 period. This volume represented approximately 40% of globally traded rice, concentrated in the Indica varieties (long-grain, non-parboiled white rice) that constitute the primary food staple for hundreds of millions of people in Africa, the Middle East, and South and Southeast Asia. No other single country commands a comparable share of any globally traded food commodity, making India's rice market position uniquely powerful and uniquely disruptive when reversed.

The July 20, 2023 notification banning non-basmati white rice exports was triggered by a combination of domestic price pressures (retail rice prices in India had risen approximately 11% year-on-year by mid-2023), a below-normal 2023 southwest monsoon that threatened the kharif rice crop (ultimately revised to only marginally below-normal), and electoral considerations in key rice-producing states ahead of the 2024 general elections. The ban was implemented through a prohibition on exports rather than an export tax, which would have reduced but not eliminated exports; this policy choice maximized domestic supply but maximized external market disruption.

The market response was rapid and severe. Within six weeks of the ban announcement, the FAO All Rice Price Index had risen 15%; by November 2023, Thai Indica 5% broken rice (the primary global benchmark) had risen approximately 40% from pre-ban levels. Importing countries in West Africa, which rely on Thai and Vietnamese Indica rice to supplement domestic production during lean seasons, faced import bills 35-45% higher than projected in their fiscal planning. Countries with limited foreign exchange reserves, including several Sahelian states and parts of the Horn, faced acute trade financing constraints that forced reduction in commercial rice imports precisely when domestic production was also below normal due to the El Niño drought.

India progressively lifted restrictions through late 2024, and by mid-2026 global rice markets have corrected with both India, Thailand, and Vietnam competing to clear export surpluses. However, the 2023 episode has permanently changed how analysts and policymakers think about the risk of Indian rice export policy disrupting global markets: what was previously treated as a theoretical risk has been demonstrated as a practical reality.

3.12.2 The 2026 India Policy Risk Matrix

Against the background of the 2023 episode, assessing the probability of a repeat policy intervention in 2026 requires analyzing the key political economy variables that govern Indian food trade policy decisions:

Risk Factor	2023 Status	2026 Status	Risk Direction
Domestic retail rice price trajectory	+11% YoY (trigger for ban)	Currently stable but monsoon-dependent	If monsoon deficit persists: prices could rise 8-15% by October 2026, approaching 2023 trigger level
Electoral calendar	2024 general elections within 12 months	State elections in key rice-producing states late 2026	State elections in Andhra Pradesh, Tamil Nadu, Karnataka create electoral incentive to demonstrate domestic price control
Government rice stock level	FCI stocks above buffer norm	Record 2025/26 harvest: FCI stocks high	High stocks reduce political pressure for ban; but if kharif forecast deteriorates post-June, procurement concerns could emerge by August
International diplomatic pressure	Limited: no explicit G20/WTO constraint invoked	South Africa G20 Presidency has signaled intent to address food trade policies	ISDO Recommendation 5 specifically targets this mechanism; G20 standstill declaration could reduce ban probability
Global market context	Global rice tight; Southeast Asia also under El Niño stress	Global rice surplus (India/Thailand/Vietnam competing); moderate price environment	Current surplus provides buffer; El Niño could tighten markets rapidly from September, changing domestic calculus

Table 3.5: *India rice export policy risk matrix for 2026. Assessment based on ISDO analysis of Indian food trade policy precedent, electoral calendar, and current market conditions. Source: ISDO Economics & Social Affairs Department analysis; GoI Food Corporation of India stock data; FAO Crop Prospects.*

The overall assessment is that a repeat of the 2023 full ban is less likely in 2026 than it was in 2023, given higher FCI stock levels and a more favorable global price environment at the time of writing. However, the probability is not negligible (ISDO assessment: approximately 20-30% under Scenario C, Very Strong El Niño), and a partial restriction or export tax remains plausible even in the base case if domestic prices rise through the monsoon period. The potential market impact of a partial Indian restriction would be smaller than the 2023 ban but still globally consequential given the current tightness of non-India rice export supply.

CHAPTER 5

5. Forced Displacement and Migration

5.1 Conceptual Framework: Climate, Drought, and Human Mobility

The relationship between climate shocks and human migration occupies one of the most contested intersections of environmental science, political geography, and policy analysis. The popular framing, repeated in media coverage of every major drought event, presents a straightforward causal chain: drought destroys crops, people starve, people move. This framing is not wrong exactly, but it is incomplete in ways that matter for policy design. Every empirical study that has examined this relationship at the household level, including the landmark Black et al. (2011, Global Environmental Change) synthesis of climate and migration evidence, finds that the relationship is mediated by economic conditions, social networks, governance quality, asset endowments, and the availability of non-migration coping options. Households with livestock sell livestock before they migrate. Households with savings draw down savings. Households with adult children already in cities rely on remittances. Only when these buffers are exhausted does migration become the dominant strategy, and even then it is not random: it is structured by existing diaspora networks, by knowledge of destination labor markets, and by the accumulated social capital of previous household members who have made the same journey. El Niño modifies this calculation by changing the expected return to remaining versus the expected return to departing, but it does not override it.

First, the climate-migration relationship is multi-causal and context-dependent. No study in the peer-reviewed literature has found a direct, single-cause link between drought or temperature anomalies and migration rates at the household level; every well-designed study finds that the effect of climate shocks on migration is mediated by pre-existing economic conditions, social networks, governance quality, and the availability of non-migration coping strategies (Adams, 2020, Journal of Peasant Studies; Black et al., 2011, Global Environmental Change). Put plainly: El Niño does not produce migration mechanically; it increases the probability of migration by reducing the relative attractiveness of non-migration coping strategies.

Second, internal displacement dominates over cross-border migration. The dominant pattern of climate-related human movement in El Niño events is internal displacement, movement within national borders, typically from drought-affected rural areas to urban centers, secondary towns, or areas with access to irrigation or food assistance. Cross-border migration, while material in humanitarian and political terms, constitutes a smaller fraction of total climate-related mobility and is typically preceded by exhaustion of internal coping options.

Third, migration is often an adaptation strategy rather than a failure mode. For many households in the Sahel, the Horn, and Central America, seasonal or long-distance migration is an established component of the livelihood portfolio, a strategy for income diversification that pre-dates El Niño by generations. El Niño accelerates, extends, and in some cases permanently transforms these existing migration patterns, but it does not create them from a neutral baseline. The analytical question is not "does El Niño cause migration?" but "how does El Niño modify the volume, destination, duration, and demographic composition of existing mobility patterns?"

5.2 Displacement Data: The 2026 Baseline

IOM's Displacement Tracking Matrix (DTM): the most wide-ranging operational system for monitoring conflict and disaster displacement globally, provides the most current quantitative baseline available at the time of writing. The June 2026 DTM data reveals several patterns that will be amplified by the El Niño event:

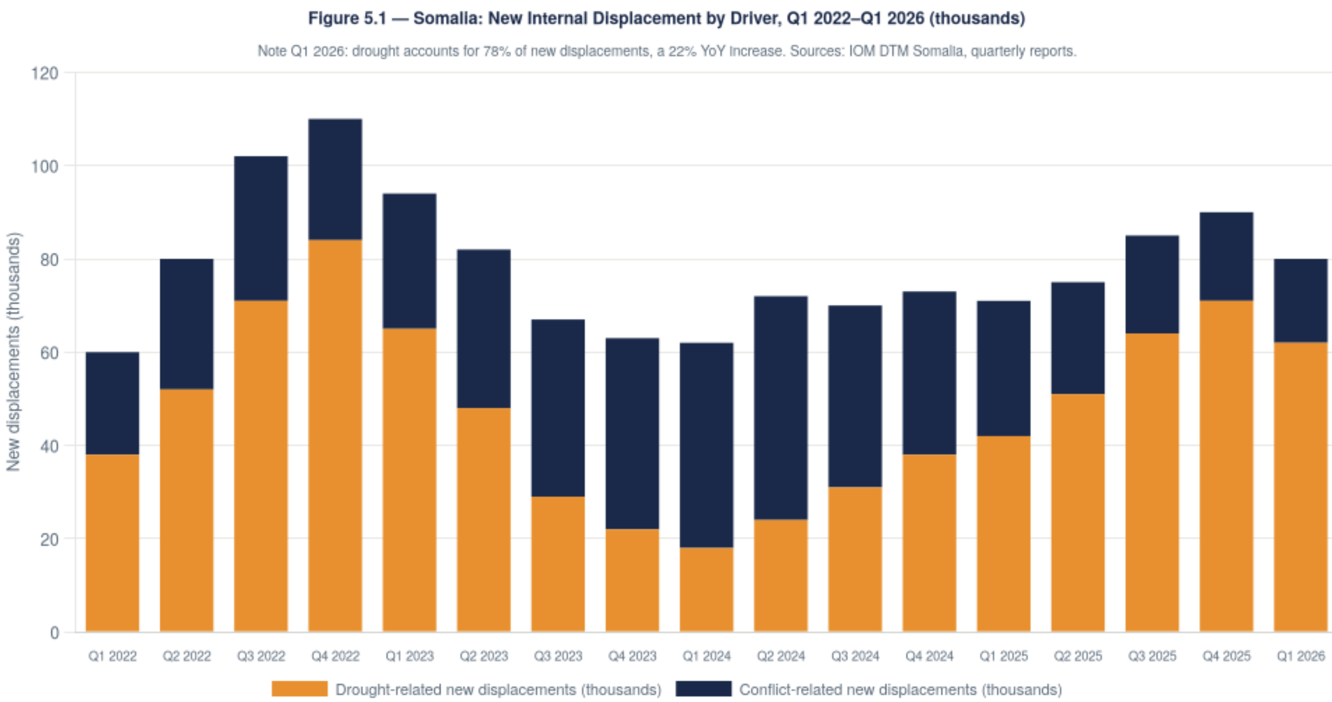

Figure 5.1: *Somalia: New Internal Displacement by Driver, Q1 2022–Q1 2026 (thousands). Orange = drought-related; navy = conflict-related. Note Q1 2026: drought accounts for 78% of new displacements, a 22% year-on-year increase. IOM DTM records approximately 62,000 new drought-induced displacements in early 2026 across five Somali districts alone. Source: IOM DTM Somalia Quarterly Displacement Tracking Reports, 2022–2026.*

The Somalia pattern, where drought already accounts for three of every four new displacements before the El Niño peak, is the most acute documented case but not an outlier. Analogous trends are documented in Ethiopia (Somali and Oromia regions), northwest Nigeria, Burkina Faso (where 2.2 million people are internally displaced by the combination of conflict and drought), and southern Malawi.

UNHCR's Global Trends in Forced Displacement 2025 (the most recent annual assessment available) documented a record 117.3 million forcibly displaced people globally at end-2025, of whom approximately 63.3 million were internally displaced persons (IDPs). Climate and disaster displacement accounted for approximately 26.4 million new internal displacements in 2025, the highest annual figure ever recorded, with drought-related displacement accounting for approximately 38% of the climate/disaster total. El Niño 2026 will drive a further increase in this already-record baseline.

IOM's early 2026 projection for Somalia alone, nearly 125,000 additional drought displacements expected in Q2 2026 under assumptions of near-normal Gu (long rains), provides a sense of the scale of new displacement that the El Niño-driven long-rain deficit is likely to produce. Extrapolating this projection across all seven regions analyzed in Chapter 3, and acknowledging that the Q2 2026 projection predates the confirmed El Niño signal and the expected June–September monsoon deficit, the total incremental climate displacement attributable to the 2026 event could reach several million people across the Sahel, Horn, and Southern Africa combined by March 2027.

5.3 Cross-Border Migration Corridors: Detailed Analysis

5.3.1 The Sahel-to-Mediterranean Corridor

As extensively documented in the companion ISDO report on irregular immigration from the Sahel to Spain (Security & Intelligence Department, July 2026), the Sahel-to-Mediterranean corridor is the most geopolitically serious migration route in the 2026 context. Spain received 64,019 irregular arrivals by sea in 2024, a historical record, with Malians (23.8%), Senegalese (18.5%), and Guineans (~8.6%) the largest nationality groups. The corridor operates through two axes: the Atlantic Route (Ruta Canaria) connecting West African coastal states to the Canary Islands, and the Central Mediterranean Route through Libya and Tunisia.

El Niño's impact on this corridor operates through the structural push factors that drive Sahelian outmigration: agricultural income collapse, livestock loss, food price inflation, and the progressive destruction of livelihoods in conflict-affected zones. An El Niño-driven monsoon deficit in June–August 2026 that damages the 2026/27 harvest in Mali, Senegal, Burkina Faso, and Niger will, with a 6–12 month lag reflecting the agricultural calendar and the time required to exhaust internal coping strategies, increase the pool of economically desperate young men for whom the opportunity cost of attempted migration falls to the level where it appears worth the risk.

The policy interaction effect documented in the companion ISDO report is analytically important: the Spain-Mauritania-Senegal bilateral agreements of 2024–25 reduced Canary Islands arrivals by approximately 63%, but simultaneously produced a 42% increase in Balearic arrivals (Algerian-Balearic route) and an extension of the Atlantic route toward Guinea-Conakry. A strong El Niño intensifying structural push factors while bilateral border management agreements remain in place will likely drive flows toward these longer, more dangerous alternative routes, increasing mortality rates without reducing overall migration pressure.

5.3.2 The Horn of Africa Corridor

The Horn of Africa migration corridor feeds into three destinations: the Arabian Peninsula via the Gulf of Aden (the Eastern Route, primarily from Somalia and Ethiopia); East and Southern Africa via Tanzania and Mozambique; and North Africa via Sudan and Libya (connecting with the Central Mediterranean Route). El Niño's impact on this corridor operates primarily through drought-induced livelihood collapse in Somali pastoral communities and Ethiopian highland farming systems, combined with the well-documented relationship between food insecurity and Al-Shabaab recruitment (discussed in Chapter 6) that can convert climate-driven economic desperation into conflict-driven displacement.

The Sudan collapse adds a compounding dimension to the Horn corridor that is without precedent in recent history. Sudan has historically served as a transit country for migrants from Ethiopia and Eritrea moving toward Libya and Europe; the civil war that began in April 2023 has simultaneously produced 8+ million internally displaced Sudanese and disrupted the transit infrastructure that supported regional migration movements. The humanitarian consequences for Sudanese civilians are severe; the spillover effects for regional migration systems are material but poorly documented due to access limitations.

5.3.3 The Central America-United States Corridor

The relationship between El Niño and migration in the Central America-to-US corridor is supported by stronger direct evidence than the Sahel or Horn corridors, because WFP has conducted direct survey research on migration intentions among food-insecure Dry Corridor households during previous El Niño events. Key findings from WFP's 2016 survey (conducted during the 2015–16 El Niño): 8% of surveyed Dry Corridor households reported plans to migrate externally; approximately 80% of those planning to migrate cited food insecurity and insufficient income as primary or secondary motivating factors.

The migration-food security relationship in the Dry Corridor is characterized by what Fransen and Kuschminder (2012, Journal of Ethnic and Migration Studies) termed the "migration hump": as income falls, migration initially increases as households invest the last of their resources in the migration journey, then falls if income falls below the minimum threshold required to finance migration at all. Households in IPC Phase 3 are near or above this migration threshold; households in IPC Phase 4 may be below it. This implies that El Niño's impact on migration is not linear: moderate food insecurity intensification may increase outmigration more than severe intensification.

For the 2026 event, the relevant population is approximately 3 million Guatemalans already in IPC Phase 3+ (February–April 2026), a pool from which even a modest increase in the fraction considering migration translates into tens of thousands of additional households attempting the northward journey. The CERF $4 million anticipatory action disbursement in June 2026 is calibrated to reach approximately 50,000 of the most vulnerable households; the remaining 2.95 million remain entirely outside the coverage of funded anticipatory assistance.

5.4 Vulnerable Population Profiles

Not all populations exposed to El Niño-driven drought are equally likely to migrate, and understanding the differential vulnerability profile matters for both humanitarian targeting and migration-management policy. Key vulnerable population profiles in the 2026 El Niño context:

- Pastoralist and agropastoralist households (Sahel, Horn, Eastern Africa): These households have the highest climate-migration susceptibility because their livelihood is entirely dependent on mobile livestock systems that are directly exposed to El Niño-driven pasture and water depletion. Livestock price collapse during distress-sale periods reduces the financial resources available for non-migration coping, while the destruction of herd assets eliminates the productive base for recovery. Pastoralist migration in El Niño years is typically characterized by rapid, long-distance movement in search of pasture, movement that crosses national borders more readily than for settled agriculturalists.
- Small-scale rain-fed farmers in marginal zones (Central America Dry Corridor, Sahel fringe, Southern Africa dryland areas): These households have limited or no access to irrigation, depend on single-season rain-fed production for 70–90% of their caloric intake, and have minimal non-farm income buffers. A single season of crop failure can eliminate household food reserves, force distress sales of productive assets, and initiate a debt spiral (often from moneylenders at 30–60% monthly interest) that makes continued agricultural investment non-viable. Young adult men in these households are typically the first to migrate as a diversification strategy; prolonged El Niño events can convert temporary labor migration into permanent displacement.
- Urban poor in affected cities (secondary cities in the Sahel, Horn, and Southern Africa): Urban food insecurity, transmitted through food price inflation rather than direct agricultural exposure, is increasingly documented as a driver of urban-to-urban or urban-to-rural displacement. In some cases, urban residents return to villages of origin during food crises, inverting the rural-urban migration direction. In others, they migrate to larger cities in search of social protection or food assistance. Both patterns have implications for urban service delivery and social cohesion in destination cities.
- Children and adolescents (all regions): El Niño-driven food insecurity is a major driver of child school dropout, both because families cannot afford school fees and because children are needed for income-generating activities (including herding, agricultural labor, and household tasks freed up by parental absence). The NEET (Not in Education, Employment, or Training) rates among young people in El Niño-affected zones have historically spiked during and after severe events, creating a long-term human capital consequence that extends well beyond the event's meteorological duration.

5.5 2026-2027 Migration Scenarios

In the absence of adequate anticipatory action, ISDO projects the following migration-related outcomes for the 2026-2027 El Niño cycle, differentiated by intensity scenario. These projections carry wider confidence intervals than the meteorological or food security projections in Chapters 2 and 3, because the migration-climate relationship is statistically noisier and because migration decisions involve household-level agency that aggregate models cannot fully capture. They should be read as plausible ranges for planning purposes, not as forecasts with the precision of crop yield models.

Under Scenario B (Strong El Niño, peak +1.5–1.9°C): New drought-induced internal displacement of approximately 8–12 million people across the Sahel, Horn of Africa, and Southern Africa combined, with a peak in the October 2026–March 2027 period. Cross-border migration pressure along the Sahel-Mediterranean corridor increases by approximately 20–35% above the 2025 baseline, primarily through the Central Mediterranean and Balearic routes following reinforcement of West African bilateral agreements. Central America-US corridor increases by approximately 10–15%.

Under Scenario C (Very Strong El Niño, peak ≥ +2.0°C): New drought-induced internal displacement of approximately 15–22 million people, with concentrated Emergency (IPC Phase 4) conditions driving accelerated displacement from Zambia, Zimbabwe, Malawi, and across the Sahel belt. Cross-border migration pressure along the Sahel-Mediterranean corridor increases by 35–55% above 2025 baseline. Central America-US corridor increases by 25–40%, representing a potential additional 150,000–250,000 irregular border crossing attempts above the 2025 baseline.

CHAPTER 6

6. Security and Conflict Nexus

6.1 Empirical Foundation: Thirty Years of Research

The academic literature on climate and conflict has expanded dramatically since the 1990s, from a relatively small body of theoretical argument to a now-substantial empirical literature involving multiple research groups, methodological approaches, and geographic scopes. This section reviews the most relevant findings for the El Niño-conflict nexus, beginning with the landmark Hsiang, Meng & Cane (2011) study and tracing the subsequent methodological debates and evidentiary accretions.

6.1.1 The Foundational Study: Hsiang, Meng & Cane (2011)

The study "Civil conflicts are associated with the global climate" (Hsiang, Meng & Cane, Nature, Volume 476, August 25, 2011) remains the most cited piece of evidence in the El Niño-conflict literature. Using a dataset of 175 countries and 234 conflicts between 1950 and 2004, Hsiang et al. found that the annual probability of new civil conflict onset in the tropics approximately doubled in El Niño years relative to La Niña years, from roughly 3% to 6%. They associated ENSO variations with "approximately 21% of all civil conflicts since 1950." The study's credibility rests in large part on its causal identification strategy: ENSO is plausibly exogenous to the confounders that typically plague conflict research (poverty, ethnic heterogeneity, political institutions), allowing the authors to use it as an instrumental variable for climate stress.

> *"ENSO may have had a role in 21% of all civil conflicts since 1950... We suggest that when crops fail and economic hardship increases, the probability of civil war onset increases. ... The role of climate in conflict may have been underappreciated."*
>
> **— Hsiang, S.M., Meng, K.C., and Cane, M.A. (2011). Civil conflicts are associated with the global climate. Nature, 476, 438–441.**

6.1.2 Subsequent Literature: Refinements and Debates

The Hsiang et al. (2011) findings have been subject to substantial methodological scrutiny, which has produced refinements rather than refutation. The core statistical association, that El Niño years see roughly double the baseline rate of civil conflict onset in the tropics, has been replicated in multiple independent datasets and across different conflict classification schemes. What the subsequent literature has added is nuance about heterogeneity: the effect is stronger in countries with high agricultural dependence and weak governance, which is exactly the profile of the Sahel, Horn, and Central American countries that face the highest El Niño exposure in 2026. It is also stronger for conflict onset than for conflict intensity, suggesting El Niño operates as a spark rather than a fuel, a finding consistent with the operational evidence from the Sahel where JNIM exploits post-drought periods of weakened community cohesion and government legitimacy to establish new territorial footholds.

- Klomp & Bulte (2013, Journal of Conflict Resolution): A direct replication that found the ENSO-conflict relationship to be sensitive to methodological choices, particularly the definition of conflict (onset vs. incidence), the time period analyzed, and the inclusion of country fixed effects. They concluded that the relationship is "fragile" in the sense that small analytical choices change the estimated effect size, but did not conclude that no relationship exists.
- Landis (2014, Journal of Peace Research): Extended the analysis to show that the ENSO-conflict correlation is stronger in countries with higher dependence on rain-fed agriculture and weaker state institutions, consistent with the proposed economic stress mechanism.
- Burke et al. (2015, Annual Review of Economics): A wide-ranging meta-analysis of 55 studies found that "one standard deviation increases in temperature or rainfall changes increase the frequency of interpersonal conflict by

2.4% and intergroup conflict by 11.3%." The meta-analytic finding substantially exceeds the Hsiang et al. point estimate, though with wide confidence intervals.

- von Uexkull et al. (2016, PNAS): Demonstrated that the drought-conflict link is mediated by agricultural dependence and ethnopolitical exclusion, and is concentrated in areas where conflict-prone groups are economically marginalized.

The preponderance of evidence in this literature, subject to the cautions noted in Chapter 1, supports the following analytical conclusions: (1) El Niño is associated with elevated conflict risk in the tropics; (2) the relationship operates through economic stress (food prices, agricultural income) rather than through resource competition or environmental degradation directly; (3) the effect is substantially stronger in countries with high agricultural dependence, weak institutions, and pre-existing political exclusion of key social groups; and (4) the effect size is probabilistic and modest in absolute terms, from 3% to 6% annual probability of new conflict onset, but consequential given the large number of exposed countries.

6.2 The Sahel: The Most Acute Convergence Zone

No region on Earth combines El Niño agricultural exposure, active jihadist insurgency, institutional collapse, and great-power military competition more acutely than the central and western Sahel. The region has experienced one of the most rapid deteriorations in human security in modern history since 2020, and the 2026 El Niño arrives at what multiple security analysts assess as the most dangerous inflection point in that deterioration.

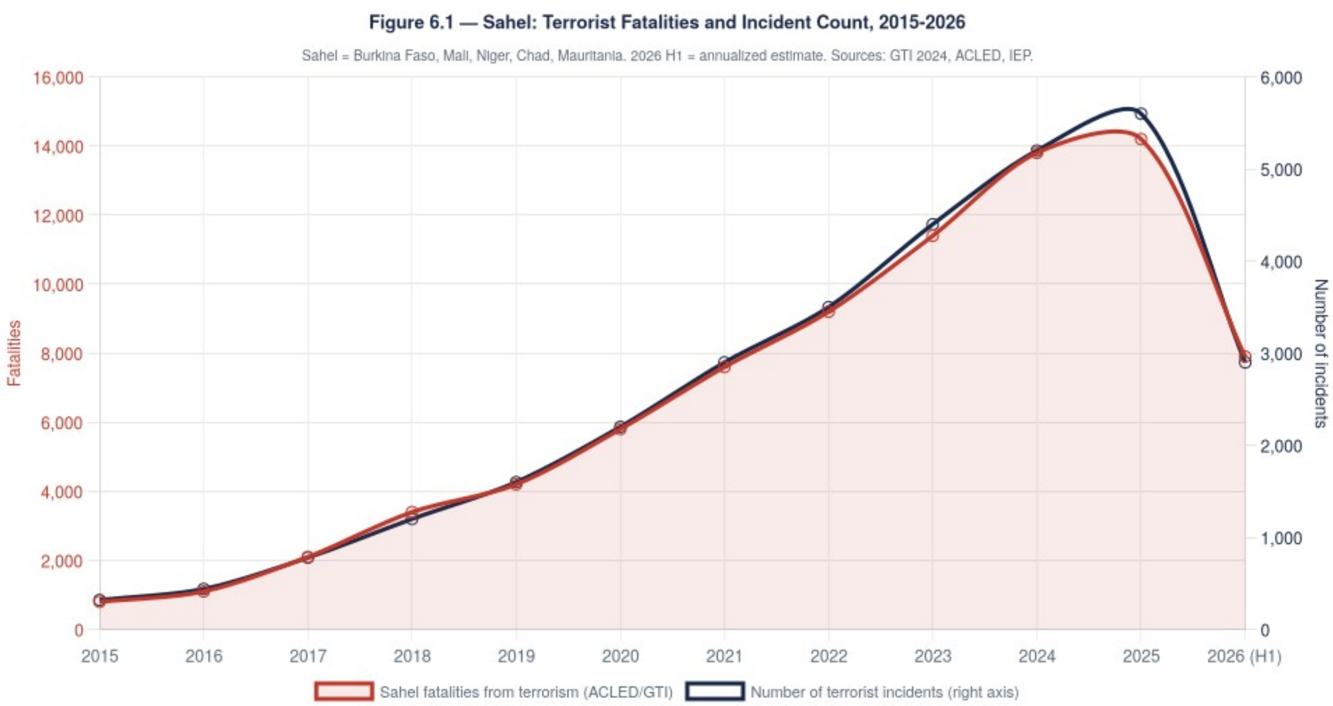

Figure 6.1: *Sahel: Terrorist Fatalities and Incident Count, 2015–2026. Red shaded area = fatalities (left axis); navy line = number of incidents (right axis). Note the near-linear increase in both metrics since 2017, with the Sahel accounting for approximately 47% of global terrorism deaths in 2023 and ranking Mali and Burkina Faso first and third globally for terrorist activity in 2024. Source: Institute for Economics and Peace, Global Terrorism Index 2024; ACLED.*

6.2.1 JNIM: Strategy, Capacity, and Climate Exploitation

JNIM (Jamaa Nusrat ul-Islam wa al-Muslimin) is the primary Al-Qaeda affiliate in the Sahel, formed in March 2017 through the merger of Ansar Dine, the Macina Liberation Front, Al-Mourabitoun, and the AQIM Sahara Emirate. By mid-2026, JNIM controls approximately 40,000 square kilometers of territory in Mali, Burkina Faso, and parts of Niger (an area roughly the size of Switzerland) and launches approximately 35–40 attacks per week across the region. The group has demonstrated increasing sophistication in financial management, territorial governance, and strategic communication.

JNIM's exploitation of climate vulnerability follows a documented strategic logic that has been analyzed with increasing specificity in reports by the Tony Blair Institute, ACLED's conflict analysis team, and multiple UN Panel of Experts reports on Mali and Burkina Faso. The logic is straightforward in outline and sophisticated in implementation. In drought-affected communities, JNIM identifies two key draw on points: water, which becomes a survival necessity when seasonal sources dry up, and food, which becomes a political resource when harvests fail. The group has developed a standardized approach to exploiting both. For water, it combines infrastructure destruction, which removes state-provided alternatives, with controlled provision through wells or water trucking that JNIM itself manages, creating a dependency relationship that is reinforced by the memory of the destroyed alternative. For food, it provides grain distributions in post-harvest deficit periods, timed to coincide with the moment when government and NGO food assistance programs have not yet reached affected communities, and explicitly frames the provision as evidence of the state's failure and JNIM's competence. Community members who accept JNIM food assistance are not necessarily joining the organization; many have no alternative and know it. But the provision creates a social debt and an information asymmetry that JNIM converts into compliance, intelligence, and eventually recruitment from the subset of the community, typically young men without alternative income, for whom the material and identity benefits of joining outweigh the risks.

- Water infrastructure control: JNIM has deliberately targeted and destroyed boreholes, water pumping stations, and irrigation infrastructure in contested areas, creating water scarcity that increases civilian dependence on JNIM-controlled water sources. The Tony Blair Institute documented a 40% increase in deliberate water infrastructure attacks by armed groups in the Sahel between 2019 and 2024.
- Food provision as territorial governance: In areas under JNIM influence, the group positions itself as an alternative provider of food assistance, distributing grain and livestock in exchange for compliance, information, and in some cases the renunciation of government ties. This "competitive service provision" strategy has been documented in the Liptako-Gourma tri-border zone and in parts of Burkina Faso's Centre-Nord and Boucle du Mouhoun regions.
- Taxation of agricultural production: JNIM levies taxes on agricultural harvests, livestock, and market transactions in territories it controls or influences. During drought years, these taxes become a mechanism of extreme extraction, imposing a fixed burden on a sharply reduced harvest, that worsens food security outcomes for farmers while funding JNIM operations.
- Recruitment from the drought-displaced: JNIM recruitment has historically been concentrated among young men whose agricultural livelihoods have collapsed, who are displaced from their communities, and who have limited alternative income-generating opportunities. An El Niño-driven monsoon deficit that destroys the 2026/27 Sahel harvest would expand this recruitment pool by several million potential members, making it the single most important security consequence of the 2026 event in the region.

6.2.2 IS-Sahel: Territorial Competition and Violence Escalation

IS-Sahel (the Islamic State in the Greater Sahara, also known as ISGS) operates primarily in the tri-border area of Mali, Burkina Faso, and Niger, where it competes with JNIM for territorial control, financial resources, and recruits. Unlike JNIM's relatively gradual expansion strategy, IS-Sahel is characterized by higher operational tempo and more indiscriminate violence against civilians, including deliberate targeting of ethnic minority communities accused of collaborating with state or anti-jihadist forces. The inter-group competition between JNIM and IS-Sahel has paradoxically intensified violence in areas where neither group has achieved dominance, as both compete for resources and recruits in an increasingly constricted operational environment.

El Niño's impact on IS-Sahel dynamics operates similarly to its impact on JNIM but with a specific additional dimension: IS-Sahel's primary source of civilian support has historically been among communities of Tuareg and Fulani pastoralists whose traditional land use and seasonal migration routes have been disrupted by conflict. An El Niño-driven degradation of pasture and water resources would increase conflict between these communities and settled farmers over access to common resources, a conflict type that IS-Sahel has consistently exploited as an entry point for recruiting community members against their "enemies" (neighboring farming communities, state security forces).

6.2.3 The Security Architecture Vacuum

The withdrawal of French forces from Mali (Operation Barkhane, completed August 2022), Burkina Faso (Operation Sabre, January 2023), and Niger (following the July 2023 coup and subsequent French expulsion) has created a security architecture vacuum that no available force is capable of filling with equivalent capacity or legitimacy. The Russian forces and Wagner/Africa Corps contractors that have replaced French forces in Mali and Burkina Faso have demonstrated: limited capacity for the complex, population-centric counterinsurgency required to dislodge jihadist territorial control; no developmental mandate that would address the governance and economic grievances underlying jihadist recruitment; and a documented pattern of human rights violations that has further alienated civilian populations from the state security apparatus.

MINUSMA (the UN Multidimensional Integrated Stabilization Mission in Mali) was terminated in December 2023 following the junta's demand for its withdrawal. No replacement multilateral force has been deployed. The ECOWAS military framework is operationally constrained by the political tensions generated by the three Sahelian military governments' suspension from ECOWAS. The net result is a security vacuum in which jihadist groups can expand with substantially reduced counterterrorism pressure, precisely at the moment when the 2026 El Niño is expected to sharply expand the pool of economically vulnerable young men from which they recruit.

6.3 Horn of Africa: Al-Shabaab and the Drought-Governance Nexus

Al-Shabaab, designated a terrorist organization by the United States, the European Union, and the United Nations, controls approximately 40% of rural southern Somalia as of mid-2026 and maintains serious influence in Hirshabelle, Jubaland, and southwestern Puntland. The organization's operational model in drought contexts follows a well-documented pattern: targeted attacks on humanitarian convoys and NGO infrastructure to prevent government-aligned food assistance from reaching drought-affected communities, followed by Al-Shabaab food distribution in those same communities to build civilian compliance and information networks.

The Federal Government of Somalia and AMISOM/ATMIS forces have made documented territorial gains against Al-Shabaab since 2022 (Operation Black Lion and subsequent campaigns), recovering large stretches of the Shabelle River valley and parts of Middle and Lower Shabelle regions. However, these gains are fragile and contested, and Al-Shabaab retains the capacity to interdict humanitarian supply lines and conduct both guerrilla and mass-casualty attacks in major urban centers. A strong El Niño drought that intensifies the displacement of rural populations toward urban areas, where Al-Shabaab's organizational presence is less dominant, could paradoxically reduce Al-Shabaab's near-term grip on rural populations while creating new security challenges in receiving cities.

6.4 State Fragility and Institutional Capacity Analysis

A consistent finding in the climate-conflict literature is that state institutional capacity is a material moderating variable: countries with stronger governance are less likely to experience conflict escalation during climate shocks, even when they are equally exposed to the meteorological event (Fearon & Laitin, 2003, American Political Science Review; Hendrix & Salehyan, 2012, Journal of Peace Research). This finding has direct policy implications for the 2026 El Niño: institutional capacity investments are simultaneously climate resilience investments and conflict prevention investments.

Country / Region	Fragile States Index 2025 (rank / 179)	Government Effectiveness (World Bank 2025, percentile)	El Niño + Conflict Interaction Risk	Primary Risk Pathway
Mali	7th most fragile	3rd percentile		JNIM territorial control + drought + post-coup institutional collapse + Wagner forces
Burkina Faso	9th most fragile	2nd percentile		72/145 communes with restricted access; JNIM + IS-Sahel + RSP factional violence
Somalia	2nd most fragile	0th percentile		Al-Shabaab control of ~40% rural south; drought displacement toward cities; maritime piracy resurgence risk
Sudan	3rd most fragile	1st percentile	CATASTROPHIC	Active civil war (SAF vs RSF); 33.7M in need; El Niño rainfall deficit on zero-capacity government
Niger	14th most fragile	5th percentile		Post-coup Western force withdrawal; JNIM infiltration of western Niger; Agadez migration hub instability
Nigeria (NE/NW)	15th nationally (subnational)	12th percentile (national)		ISWAP/Boko Haram in NE; farmer-herder conflict in Middle Belt; drought exacerbating resource competition
Zimbabwe	48th most fragile	9th percentile		El Niño + fiscal crisis + political fragility post-Mnangagwa; risk of food-insecurity-driven urban unrest
Zambia	66th most fragile	22nd percentile	MODERATE	El Niño + debt distress + hydropower collapse; risk of economic disruption rather than conflict per se

Table 6.1: *State fragility and El Niño-conflict interaction risk by country. Fragile States Index: Fund for Peace (2025). Government Effectiveness percentile: World Bank Worldwide Governance Indicators (2025). Risk rating reflects ISDO assessment of El Niño-conflict interaction risk, not baseline conflict risk. Sources: Fund for Peace, World Bank WGI, ACLED, ISDO analysis.*

6.5 Conflict Escalation Scenarios for 2026-2027

Extrapolating from the empirical literature (Hsiang et al., 2011; Burke et al., 2015), the regional vulnerability analysis, and the specific operational patterns of armed groups in the Sahel and Horn, ISDO identifies the following conflict escalation scenarios as requiring monitoring and potential policy response:

- Scenario Alpha (Sahel Cascade): A confirmed El Niño monsoon deficit in the Sahel in June–August 2026 triggers a second consecutive poor harvest (2026/27) across the Liptako-Gourma region. JNIM and IS-Sahel expand territorial influence in the resulting governance vacuum. Jihadist spillover into "third-generation" coastal states (Benin, Togo, Ghana, Côte d'Ivoire) accelerates from current incipient levels to established presence. West African integration (ECOWAS) is permanently fractured. The window for multilateral stabilization closes.
- Scenario Beta (Horn Displacement Spiral): El Niño long-rain deficit in Ethiopia and Somalia in June–September 2026 drives a displacement surge of 2–3 million people from rural to peri-urban areas. Al-Shabaab uses the displacement for financial and recruitment gain. Federal Government of Somalia's military campaign gains are reversed. The Ethiopian political situation deteriorates as domestic food stress increases pressure on an already-

fragile post-Tigray governance compact. Cross-border displacement between Ethiopia, Somalia, and Kenya intensifies.

- Scenario Gamma (Sudan-Horn Food Security Collapse): El Niño overlaid on Sudan's civil war produces a simultaneous collapse of rain-fed agriculture in Darfur, Kordofan, and Blue Nile states, generating IPC Phase 5 (Catastrophe) conditions in conflict-affected agricultural areas. International humanitarian access remains blocked. The conflict in Sudan metastasizes into neighboring states through refugee and armed actor spillover into Chad, South Sudan, and Ethiopia.

CHAPTER 7

7. Macroeconomic and Sectoral Impacts

7.1 Aggregate Economic Modeling: The State of the Literature

The quantification of El Niño's macroeconomic consequences has advanced substantially in recent years, moving from descriptive ex-post damage assessments to prospective, model-based projections that attempt to quantify both the direct impacts and the persistence effects. This section reviews the three most analytically well-established contributions and their implications for the 2026 event.

The foundational peer-reviewed estimate is provided by Callahan and Mankin (2023, Science, "Persistent Effect of El Niño on Global Economic Growth"). Using a global climate-economy model calibrated against the historical ENSO record and validated against observed GDP responses in ENSO-sensitive economies, Callahan and Mankin find that the 1982–83 El Niño generated approximately $4.1 trillion in cumulative income losses globally; the 1997–98 event generated approximately $5.7 trillion; and they project approximately $84 trillion in 21st-century cumulative losses under intensifying ENSO in a high-emissions scenario.

The methodological distinction that makes the Callahan and Mankin work particularly valuable is their finding that the economic impacts are "persistent", that is, the GDP losses associated with El Niño events do not reverse within two to three years as conventional disaster economics might predict, but continue to suppress growth trajectories for three to five years after the event's meteorological conclusion. Lead author Christopher Callahan stated in a 2023 press release: "The persistent nature of these losses is the most important finding. Societies and economies absolutely do not just take a hit and recover."

A companion study in Nature Communications (2023) produced contemporaneous point-in-time loss estimates using a slightly different modeling approach: $246 billion for 1982–83, $401 billion for 1997–98, and $739 billion for 2015–16 in contemporaneous losses, with cumulative four-year losses of $1.3 trillion, $2.1 trillion, and $3.9 trillion respectively. The discrepancy between the Callahan/Mankin cumulative figures and the Nature Communications contemporaneous figures reflects the different time horizons modeled (5 years vs. 4 years) and the treatment of persistence effects.

For the 2026 event, Citigroup Global Perspectives & Solutions (2026) produced a scenario-based economic assessment: base case (Strong El Niño): $3–5 trillion in cumulative losses over five years (approximately 2.7–3.2% of projected global GDP over the period); "super El Niño" scenario (Very Strong, peak ≥2.0°C): up to $7 trillion (approximately 6.4% of GDP). The Citigroup analysis explicitly incorporates climate change amplification factors, the warming background that produces more severe agricultural and infrastructure impacts per unit of ENSO anomaly, not present in the historical-event-based models.

At the national level, FAO and the Anticipation Hub (2024) found that in the most vulnerable El Niño-affected economies, the event reduced GDP by up to 1.7 percentage points and elevated public debt ratios, further constraining the fiscal space available for national disaster response. This fiscal feedback loop is the mechanism through which El Niño events compound over time: the countries most damaged are least able to invest in recovery and resilience, producing the persistence effects that Callahan and Mankin document.

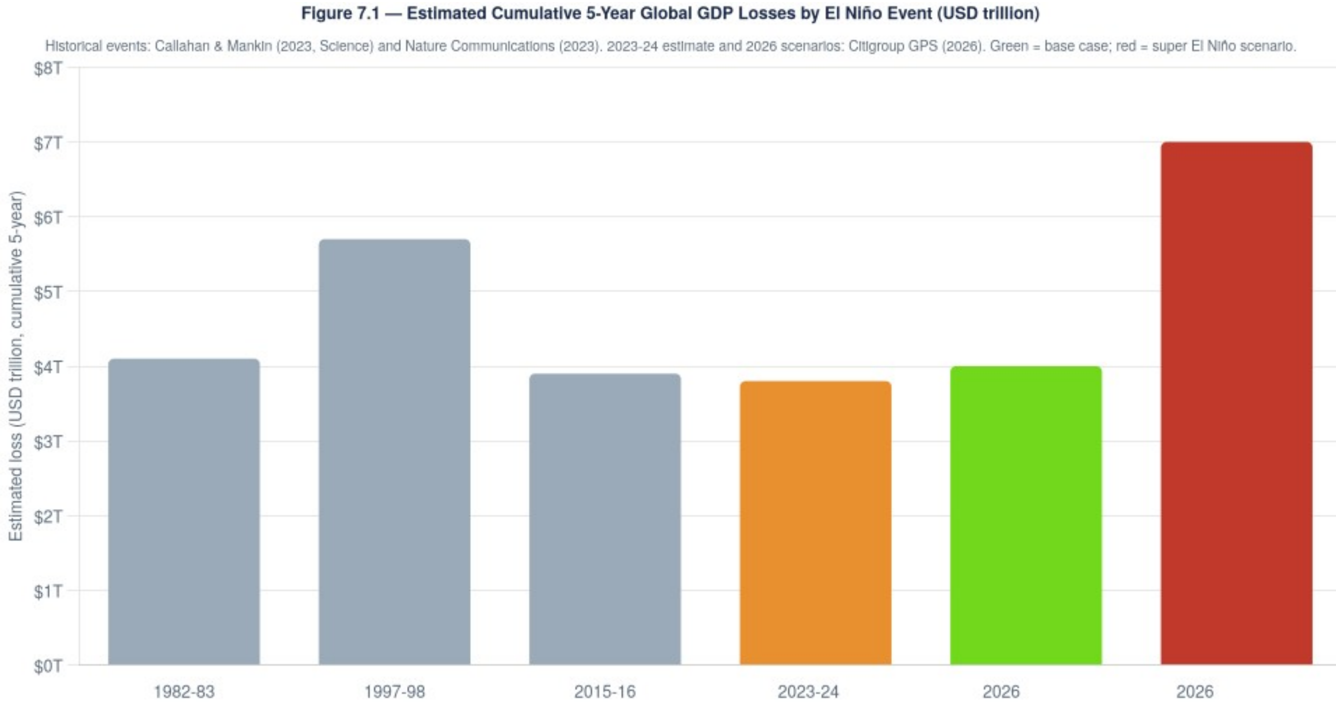

Figure 7.1: *Estimated Cumulative 5-Year Global GDP Losses by El Niño Event (USD trillion). Historical events: Callahan & Mankin (2023, Science) and Nature Communications (2023). 2023–24 estimate: Citigroup GPS (2026) retroactive estimate. 2026 scenarios: Citigroup GPS (2026). Green = base case (Strong event); red = super El Niño scenario (Very Strong, peak ≥ +2.0°C). Sources: Callahan & Mankin 2023; Nature Communications 2023; Citigroup GPS 2026.*

7.2 Country-Level GDP and Fiscal Exposure

Country	GDP per capita PPP (2025, USD)	GDP growth 2025 (%)	Projected El Niño GDP impact (pp)	Debt/GDP ratio (2025)	Fiscal capacity to self-respond
Zimbabwe	$2,400	+1.8%	–1.5 to –2.5 pp (Scenario C)	~95% (IMF estimate)	VERY LIMITED: external arrears unresolved; USD-only economy; informal financing dominant; ARC insurance primary fiscal buffer
Zambia	$4,100	+2.4%	–1.2 to –2.0 pp	~145% (post-restructuring)	LIMITED: post-restructuring debt covenant restrictions; copper revenue highly correlated with hydropower capacity
Malawi	$1,500	+2.1%	–1.0 to –1.7 pp	~62%	LIMITED: FX crisis; parallel rate premium >100%; tobacco export revenue only buffer; IMF Extended Credit Facility constrains expenditure
Ethiopia	$2,800	+6.0%	–0.8 to –1.4 pp	~38%	MODERATE: relatively stronger fiscal position; large domestic food production base; humanitarian appeal capacity
Niger	$1,200	+4.8%	–0.9 to –1.5 pp	~55% (est.)	VERY LIMITED: post-coup suspension of EU/US budget support; gold/uranium export revenue blocked by sanctions

Country	GDP per capita PPP (2025, USD)	GDP growth 2025 (%)	Projected El Niño GDP impact (pp)	Debt/GDP ratio (2025)	Fiscal capacity to self-respond
Pakistan	$6,200	+3.5%	–0.5 to –1.2 pp	~74%	LIMITED: IMF SBA program in force; 60%+ of revenue to debt service; limited fiscal headroom; food import dependent
Guatemala	$9,400	+3.8%	–0.3 to –0.7 pp	~27%	MODERATE: relatively low debt; remittance buffer (18% of GDP); anticipatory action plan pre-positioned

Table 7.1: *Country-level GDP and fiscal exposure to El Niño 2026. GDP per capita and debt ratios: IMF World Economic Outlook (April 2026). GDP impact projections: ISDO based on Callahan & Mankin (2023) country-level regression coefficients and Citigroup (2026) scenario parameters. Fiscal capacity assessment: ISDO analysis.*

7.3 The Hydropower Cascade: Kariba as Case Study

The Southern African hydropower crisis of 2023–24 is the most concrete recent illustration of El Niño's second-order economic consequences, the knock-on effects that flow from agricultural and hydrological impacts into energy systems, industrial production, and public services. The Kariba Dam case merits detailed treatment because it is both a likely repeat scenario in 2026/27 and a paradigmatic example of the infrastructure vulnerabilities that make El Niño events economically catastrophic in ways that agricultural loss data alone do not capture.

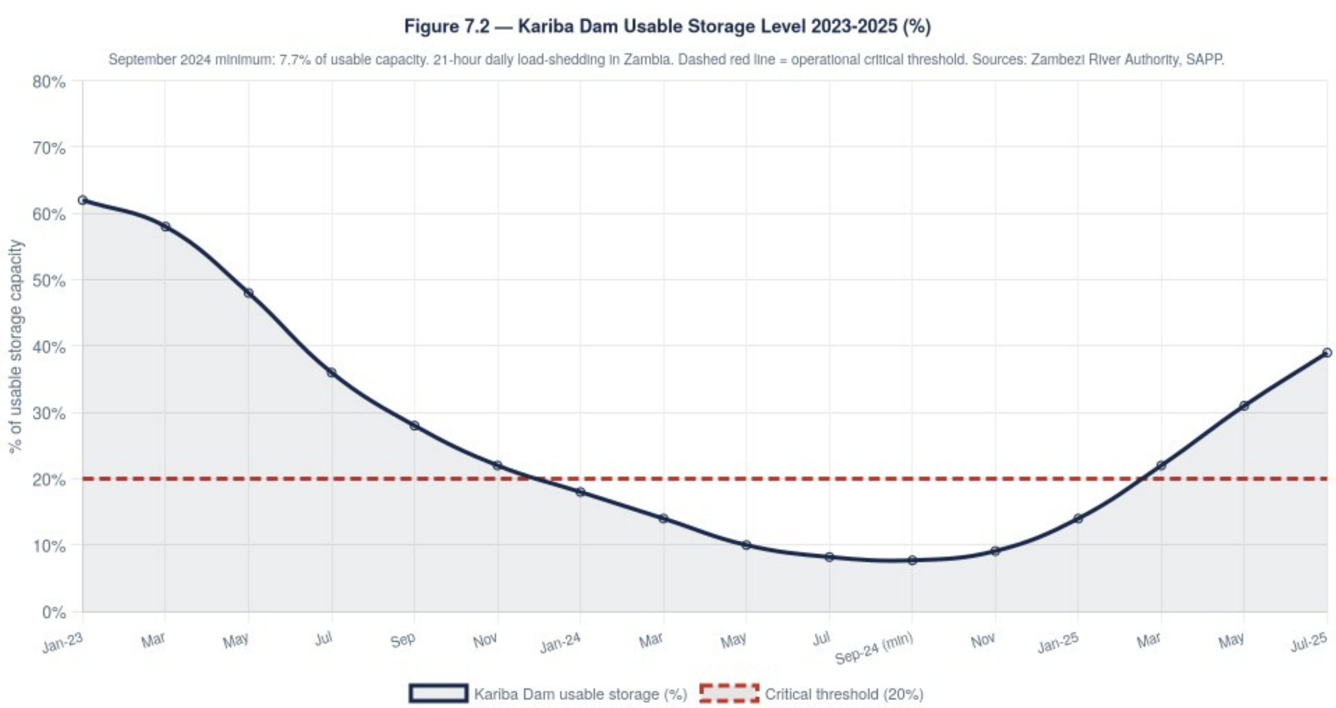

Figure 7.2: *Kariba Dam Usable Storage Level 2023–2025 (% of usable capacity). The September 2024 minimum of 7.7% forced daily load-shedding of up to 21 hours in Zambia and near-complete shutdown of Zimbabwe's Kariba power station (214 MW operational vs. 1,050 MW installed capacity). Dashed red line = operational critical threshold (20%). The dam has not returned to full operational capacity as of mid-2026, entering the 2026/27 El Niño season partially depleted. Sources: Zambezi River Authority; SAPP Monthly Generation Report; World Bank Infrastructure Note (2025).*

The Kariba crisis produced a cascade of economic consequences that operated through multiple transmission channels simultaneously. The copper mining channel: Zambia's Copperbelt produced approximately 800,000 metric tons of refined copper in 2023, generating approximately $6.4 billion in export revenue (approximately 75% of Zambia's total goods exports). Extended power outages forced operational curtailment at major mines, reducing 2024 copper output by an estimated 15–20% and directly reducing foreign exchange earnings. The food system channel: electrical outages disrupted milling operations (maize must be milled before it can be consumed), cold-chain infrastructure for food distribution, and water pumping systems for urban water supply, compounding the agricultural production shortfall with a food distribution failure. The public service channel: hospitals dependent on electricity lost refrigeration for vaccines and blood products; operating theaters were unable to function; water treatment plants went offline in multiple cities.

The Zambezi River Authority (ZRA) monitors Kariba storage levels weekly. As of the most recent reading available for this report (late June 2026), Kariba storage remained sharply below its long-term average for this time of year, reflecting the partial but incomplete refilling of the reservoir during the 2024/25 and 2025/26 rainy seasons. If the 2026/27 austral summer rainy season confirms the below-normal rainfall expected under the El Niño forecast, Kariba storage could fall to critical levels (below 20% of usable capacity) by August–September 2027, repeating the 2024 crisis.

The medium-term solution to Southern Africa's hydropower vulnerability is regional grid diversification and expanded investment in non-hydropower renewable energy. The Southern African Power Pool (SAPP) has documented approximately 2,500 MW of solar and wind projects in various stages of development across the SADC region; accelerating these projects, particularly battery-storage-enabled solar in Zambia and Zimbabwe, would seriously reduce the vulnerability of both countries to drought-driven hydropower shortfalls. ISDO recommends emergency fast-tracking of these projects as part of the El Niño response, as elaborated in Chapter 9.

7.4 Agricultural Commodity Export Revenue Losses

El Niño-driven agricultural production shortfalls translate directly into government revenue losses through the fiscal channels of reduced agricultural export earnings, lower value-added tax from reduced economic activity, and decreased personal income tax from agricultural-sector workers. For the most agriculturally dependent economies in the analysis, those where agriculture contributes more than 25% of GDP and more than 40% of export earnings, these fiscal effects can be severe.

Quantitative estimates for specific commodity export revenue losses are inherently scenario-dependent and are presented here as ranges rather than point estimates. Under Scenario B (Strong El Niño), ISDO estimates: Zimbabwe maize and tobacco export losses of $180–280 million (approximately 8–12% of projected 2026 agricultural export revenue); Zambia copper output losses (through hydropower disruption rather than direct El Niño agricultural impact) of $600–900 million; West African cocoa revenue losses (Côte d'Ivoire and Ghana combined) of $800 million–$1.4 billion; Indonesian palm oil production losses of $1.2–2.0 billion; and Australian wheat production losses of $900 million–$1.5 billion.

Under Scenario C (Very Strong), these estimates increase by approximately 50–80%, and additional knock-on losses from global commodity price impacts, trade finance disruption, and insurance claims would substantially increase the aggregate figure beyond the sum of individual national export losses.

7.5 Insurance, Reinsurance, and Sovereign Risk Finance

The insurance dimension of El Niño risk management deserves detailed treatment because the 2023–24 event produced the first operational proof-of-concept for parametric sovereign insurance at scale in the Southern African context, and because the 2026 event creates both an opportunity to extend this coverage and a test of the mechanism's adequacy.

African Risk Capacity (ARC) is the African Union's specialized climate risk pooling mechanism, established in 2012 and operational since 2014. ARC offers parametric (index-based) drought insurance to African governments, with payouts triggered by satellite-based vegetation and rainfall indices rather than assessed crop losses. The parametric structure allows payouts to be processed within weeks of trigger conditions being confirmed, compared to the approximately 18 months typically required to mobilize donor humanitarian financing.

ARC's 2023–24 payouts demonstrated both the mechanism's effectiveness and its current coverage limitations: Zimbabwe received $31.8 million (the largest single ARC payout in the mechanism's history, supporting approximately 508,435 households across 27 districts); Zambia received $13.3 million; Malawi received $11.6 million; and Mozambique received $5.5 million. Total ARC payouts for 2023–24 were approximately $62 million, meaningful but far below the scale of the assessed humanitarian need (Zimbabwe alone appealed for $2 billion). The $62 million represents what was available to purchase in advance through ARC; the $2 billion represents what was needed in response. The gap between insured and needed is the primary metric of the coverage inadequacy that ISDO's policy recommendations address.

Swiss Re Institute projects total global insured natural-catastrophe losses in 2026 at approximately $148 billion (in a base-case scenario) and up to $320 billion in modeled extreme scenarios. These figures, while not El Niño-specific, reflect the broader insurance market environment in which El Niño 2026 claims will be processed. The global natural-catastrophe protection gap, the difference between total economic losses and insured losses, stood at approximately $424 billion in 2025, with emerging economies 80–90% uninsured by comparison with advanced economies' 50–60% insured shares.

CHAPTER 8

8. Humanitarian Response Architecture

8.1 The Financing Crisis: Structural Analysis

The 2026 El Niño arrives against the worst humanitarian financing backdrop in at least a decade. This is not simply a quantitative observation about the level of funding; it reflects structural changes in the political economy of humanitarian aid that are likely to persist and may worsen over the near- to medium-term, creating a permanent downward pressure on the humanitarian system's capacity to respond to large-scale events like El Niño.

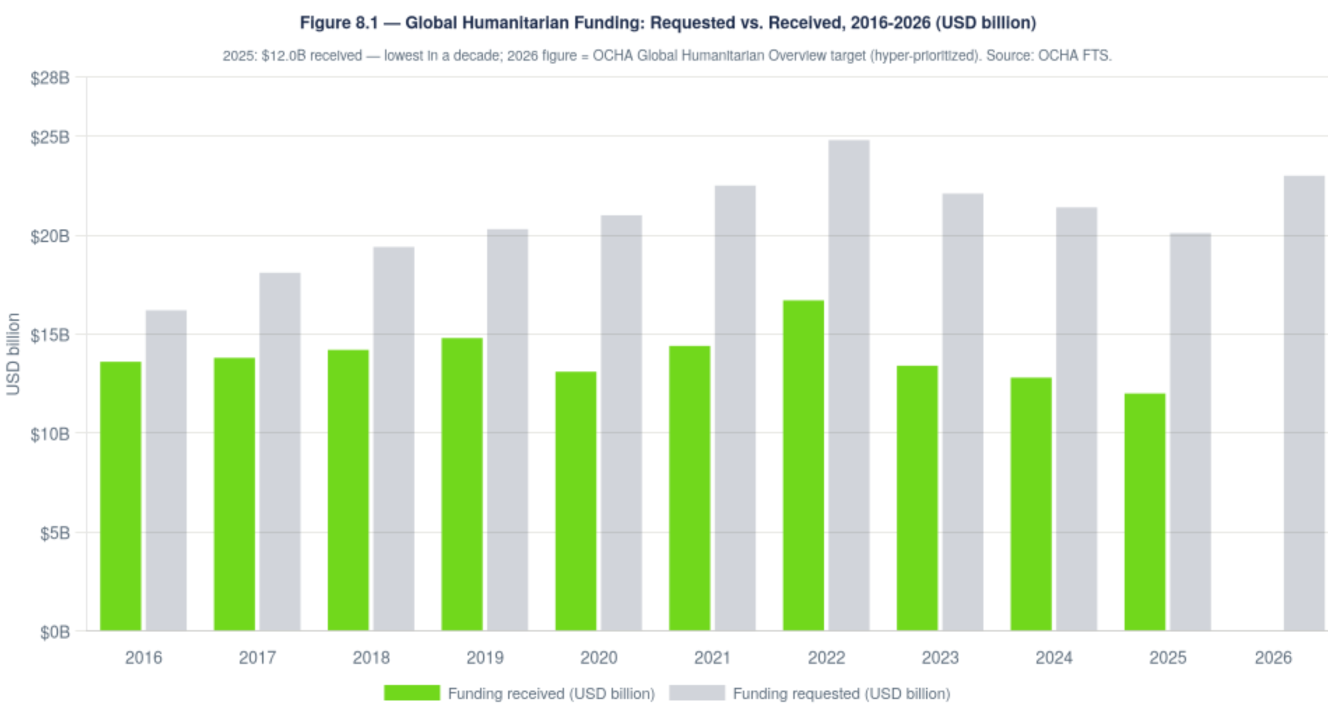

Figure 8.1: *Global Humanitarian Funding: Requested vs. Received, 2016–2026 (USD billion). Green bars = funding received; light bars = funding requested per OCHA Global Humanitarian Overview. 2025: $12.0 billion received, the lowest in a decade; 2026 target = $23.0 billion (hyper-prioritized GHO). The structural gap between requests and received funding has been persistent since 2020 and widening since 2023. Source: OCHA Financial Tracking Service (FTS); ISDO compilation.*

The structural drivers of the financing crisis are multiple and interacting. First, the diversion of donor resources toward European security financing following Russia's 2022 invasion of Ukraine has permanently reallocated material portions of NATO member humanitarian budgets toward defense, border security, and Ukrainian reconstruction. This reallocation is not temporary: it reflects a reassessment of defense priorities that is unlikely to reverse regardless of the Ukraine conflict's trajectory.

Second, domestic political constraints on aid budgets in key donor countries have intensified. The United States, historically the world's largest humanitarian donor, providing approximately 40% of global humanitarian funding at peak, has experienced Congressional resistance to overseas aid appropriations that has reduced both the volume and predictability of US humanitarian financing. Similar dynamics are operating in Germany (constitutional debt brake constraints), the United Kingdom (development finance merger with foreign policy), and several Nordic countries.

Third, the multiplication of simultaneous humanitarian crises, Sudan, DRC, Yemen, Gaza, Haiti, Ukraine, and multiple Sahel emergencies simultaneously, has created "compassion fatigue" and donor prioritization pressures that force humanitarian agencies to make explicit tradeoffs between crises. In a year when the Sudan conflict generates massive political attention and funding demands, El Niño response competes for the same limited donor budget envelope.

The quantitative consequence of this structural financing crisis for the 2026 El Niño response is stark. The 2026 Global Humanitarian Overview (GHO), which OCHA explicitly described as "hyper-prioritized" to match available funding rather than reflecting assessed need, targets $23 billion for 87 million people. The actual need was assessed at approximately 305 million people requiring humanitarian assistance globally, implying that the GHO covers only approximately 29% of those in documented need. Against this baseline, funding the $202 million FAO/WFP El Niño anticipatory action appeal, 0.9% of the GHO target, should be among the most achievable near-term financing goals. The evidence base for its effectiveness is stronger than for virtually any other humanitarian investment of comparable scale.

8.2 The FAO/WFP Joint Anticipatory Action Appeal: Architecture and Evidence

The first-ever Joint Anticipatory Action Appeal by FAO and WFP, launched on June 18, 2026 and seeking $202 million to protect 8.8 million people across 22 high-risk countries, represents the most consequential institutional evolution in El Niño humanitarian preparedness since the development of the ENSO forecasting system itself. This section analyzes its design, evidence base, and current funding status.

The appeal is built on the anticipatory action model, which treats pre-event risk reduction as a fundamentally different and higher-value activity than post-event emergency response. Anticipatory action, delivering assistance before a climate shock materializes, based on meteorological triggers, allows: agricultural protection activities (drought-tolerant seed distribution, livestock destocking support before prices collapse, cash transfers before harvest failure) that are impossible or prohibitively expensive after the event; market stabilization through pre-event food purchases that avoid the price spike that emergency procurement generates; and protection of productive assets (livestock, equipment, seed stocks) that, once lost, require multiple years to rebuild.

The evidence base for anticipatory action's effectiveness has grown substantially in recent years, moving from theoretical arguments about timing to empirical evaluations with control groups, randomized designs where feasible, and economic return calculations that meet the standards required for policy investment decisions in finance ministries. This matters because the primary skepticism about anticipatory action in donor capitals is not about the logic but about the evidence: does it actually work in practice, and how confident can we be in the return estimates? The current answer is: it works, and we are reasonably confident in returns in the $5-7 per dollar range based on multiple independent evaluations, though the confidence intervals are wide enough that claiming precision beyond this range would misrepresent the state of the evidence.

- Bailey and Harvey (2017, World Development): Using a randomized controlled trial design in Ethiopia, found that households receiving anticipatory drought assistance one to two months before a drought event had better food security outcomes, less asset loss, and less child malnutrition than matched control households receiving equivalent assistance three months after the event.
- WFP Anticipatory Action Operations Review (2025): Found that anticipatory action programs reached between 3.3 and 6.2 million people per year in 2023 and 2024 respectively, with cost-effectiveness ratios of approximately $5–7 in avoided humanitarian response costs per $1 of anticipatory investment in the programs evaluated.
- FAO Anticipatory Action Tracker (2026): Documents 93 anticipatory action interventions completed or in progress globally in 2025, with a combined reach of approximately 4.8 million people and an average cost-effectiveness ratio (based on avoided losses in livestock, crops, and productive assets) of approximately $6.20 per $1 invested.
- Horn of Africa analysis (Anticipation Hub, 2024): Found $2.3–3.3 in net benefit per $1 of anticipatory action investment in drought-prevention programming across Ethiopia, Somalia, and Kenya, with the highest returns from livestock destocking support provided 6–8 weeks before drought-induced mortality began.

8.3 Early Warning Systems: Architecture and Performance

The information infrastructure available for El Niño impact monitoring and anticipatory action trigger management is the most sophisticated in the history of humanitarian response. This section describes the key systems and their performance characteristics:

8.3.1 FEWS NET

The Famine Early Warning Systems Network, funded by USAID and operated through a consortium including USGS, NASA, NOAA, and multiple academic institutions, provides monthly IPC-equivalent acute food insecurity projections at sub-national scale for 35+ countries. FEWS NET country reports are produced 6–12 times per year, providing both a current situation assessment (most likely outcomes over the next four months) and a projected situation (most likely outcomes over the following four months). The FEWS NET temporal projection horizon (8 months) is broadly compatible with El Niño's lead time for agricultural impact, making it the primary operational tool for anticipatory action trigger management in the Sahel, Horn, and Southern Africa.

FEWS NET's analytical model incorporates: satellite-based precipitation monitoring (CHIRPS, FLDAS); vegetation condition indices (NDVI anomalies); market price monitoring (WFP's Food Price Monitoring and Analysis tool); livelihood zone mapping; and field validation through partner network organizations. Its track record in anticipating food security deteriorations has been assessed as broadly accurate, with a tendency toward conservative projections (understating rather than overstating deteriorations) that may undercount the risk in rapidly developing crisis situations.

8.3.2 The IPC Process

The Integrated Food Security Phase Classification (IPC) provides the globally accepted standard for food security emergency classification, from IPC Phase 1 (Minimal) through Phase 5 (Catastrophe/Famine). IPC analyses are produced through a multi-agency consensus process involving national governments, UN agencies, NGOs, and academic institutions, and are formally endorsed by the IPC Global Support Unit. The IPC process is both an analytical tool and a political process: its findings are used to mobilize donor financing, trigger humanitarian response systems, and in some cases activate domestic emergency procurement and reserve releases.

The IPC's temporal limitation is relevant to the El Niño context: analyses project 6–8 months ahead, meaning that the El Niño impact on the 2026/27 Southern African harvest (October 2026 onward) will not be visible in IPC projections published before approximately October 2026. This creates a gap between the meteorological evidence (which already warrants anticipatory action) and the food security classification evidence (which will lag by 4–6 months). The resolution of this gap is precisely the role of the FAO/WFP Joint Anticipatory Action Appeal, which uses meteorological forecasts rather than food security classifications as its primary trigger.

8.3.3 ICPAC/GHACOF and GEOGLAM

The IGAD Climate Prediction and Applications Centre (ICPAC) produces the Greater Horn of Africa Climate Outlook Forum (GHACOF) seasonal climate outlook four times per year, providing probabilistic precipitation and temperature forecasts that directly inform anticipatory action triggers for the Horn of Africa. The May 2026 GHACOF was the primary source for the June–September 2026 rainfall probability estimates used in Chapter 3.3 of this report.

The GEOGLAM Crop Monitor, produced under the G20 Agricultural Market Information System (AMIS) by a consortium of national agricultural monitoring agencies, provides monthly assessments of crop condition (rated from "favorable" to "failure" across eight production stages) for major growing regions globally. The Crop Monitor's near-real-time satellite-based assessments provide an early signal of production shortfalls before yield surveys or harvest data become available, typically with a 4–6 week lead time relative to formal government crop assessments.

8.4 Coverage Gaps and the Binding Constraint

The fundamental constraint on anticipatory El Niño response in 2026 is neither information quality nor operational capacity. Both are at historically high levels: the forecast has never been more reliable, the operational models have never been more tested, and the implementing agencies have never had more specific knowledge of what works in which context. The constraint is financing arriving before the trigger windows close, in the right instruments, at the right scale. This is a genuinely difficult problem because it requires donor governments to make fiscal commitments based on probabilistic forecasts rather than documented crises, in advance of the political pressure that normally drives emergency appropriations. Solving it permanently requires institutional architecture changes, some of which are described in Chapter 9. Solving it for 2026 specifically requires a smaller number of large donors, five to eight governments who together could fully fund the $202 million appeal, to authorize emergency humanitarian contingency transfers from existing voted appropriations before the August trigger windows close. This is technically possible. It has been done before, including for COVID-19 and for the 2022 Ukraine humanitarian response. What made it possible in those cases was the political salience of the crisis, not the scale of the financial need. Making El Niño anticipatory action politically salient before the crisis is visible remains the hardest problem in humanitarian advocacy.

- Before trigger thresholds close: Anticipatory action for the June–August 2026 West African Monsoon period requires disbursement by early July at the latest for planting-related activities; for the October 2026 Southern African season, by August–September.
- At sufficient scale: The $202 million FAO/WFP appeal covers 8.8 million people, approximately 4% of the 52.8 million in IPC Phase 3+ in the Sahel alone. Full funding of the appeal would be a serious but far-from-sufficient response.
- In the right form: Anticipatory action requires predictable, fast-disbursing financing, not the traditional humanitarian pledging conference model, which typically produces funding 6–18 months after the initial request. Forecast-based financing mechanisms (CERF, regional humanitarian funds, anticipatory financing windows at the World Bank IDA and the African Development Bank) are the appropriate instruments.

ISDO estimates, based on the regional analyses in Chapter 3 and the scaling parameters of existing anticipatory action programs, that full anticipatory coverage of the most vulnerable populations in the 22 FAO/WFP priority countries would require approximately $800 million–$1.2 billion, four to six times the current appeal. This is, by any standard, a modest sum relative to both the avoided humanitarian costs (estimated at $5.6–8.4 billion at the $7 per $1 return ratio) and the macroeconomic losses documented in Chapter 7. The case for investment is overwhelming; the constraint is political will.

5.6 The Economics of Attempted Migration Under Food Stress

The decision to attempt irregular migration is rarely impulsive. For households in the Sahel and Central America, it typically involves months of deliberation, asset liquidation to finance the journey, and complex calculations about expected returns relative to the cost and risk of remaining. El Niño accelerates this decision by shifting the expected-value calculation: it reduces the expected return from remaining (by destroying agricultural income) while not necessarily reducing the expected return from migration (which depends on destination labor markets, remittance potential, and diaspora networks that are independent of the drought).

The financing of irregular migration is itself a food security issue. Journeys from Mali or Senegal to the Canary Islands cost approximately 1,500-2,500 euros; from central Mali to the Libyan coast costs 800-1,200 euros. These sums typically exceed annual household cash income for rural families and are financed through a combination of household savings drawdown (depleting the safety net), asset sales (livestock, jewelry, equipment), and debt from informal moneylenders at rates of 20-50% per month. Families that have invested in migration and seen their family member succeed typically recover the debt within 2-3 years of remittances. Those who invest and lose their family member to death or imprisonment in transit suffer both the economic loss and the psychological cost.

An El Niño event that destroys household agricultural income does two things to this calculation simultaneously. It increases the urgency of the decision (remaining offers little income; departure offers uncertain but potentially substantial remittances) while also reducing the quality of the migration financing (families have fewer assets to sell, or can only sell depleted livestock at depressed prices). The net effect on migration volumes depends on which force dominates. Historical research by Mbaye and Gueye (2019, World Bank Economic Review) found that moderate drought in the Sahel increased outmigration by 5-8%, while severe drought reduced outmigration as households fell below the financing threshold. This non-linear relationship implies that very severe El Niño events (Scenario C) may actually produce smaller absolute increases in migration than moderate events (Scenario B), because the destruction of household assets removes the financing capacity for the journey. The policy implication is counterintuitive but important: the most migration-suppressing investment is food security assistance that keeps households above the asset threshold required to finance migration, not because it makes departure unnecessary, but because it preserves the household's option value to wait for better conditions.

5.7 Displacement Camp Conditions and Secondary Health Risks

El Niño-driven displacement does not end when people reach safety. The conditions in displacement camps and spontaneous settlement sites in the Sahel, Somalia, and Central America are themselves a source of mortality and morbidity that compounds the direct impacts of drought and food insecurity. Three secondary health risks are most relevant to the 2026 context.

Cholera and waterborne disease. Displacement concentrates populations at water points that cannot support the increased demand, leading to contamination of drinking water sources. The Sahel has experienced a resurgence of cholera in displacement contexts, with Burkina Faso reporting more than 23,000 cases in 2024, and Nigeria recording over 12,000 in the same year. An El Niño event that simultaneously concentrates displaced populations and reduces water availability in displacement areas will intensify this risk sharply.

Acute respiratory infections. Overcrowded displacement settings with inadequate shelter expose children under five to respiratory infections that, combined with concurrent malnutrition, carry high case fatality rates. The interaction between wasting (acute malnutrition) and pneumonia is particularly deadly: malnourished children have compromised immune function and reduced respiratory muscle strength, making them both more likely to contract pneumonia and less able to recover from it. Under Scenario C El Niño conditions, districts in the Sahel with GAM rates above 20% can expect increased under-five pneumonia mortality.

Mental health. El Niño-driven crisis has impacts on mental health that are consistently underweighted in humanitarian assessments and underfunded in response allocations. Chronic stress from food insecurity, loss of productive assets, separation from family members who have migrated, and the trauma of displacement all contribute to elevated rates of depression, anxiety, and post-traumatic stress. Research by Jordans et al. (2016, BMJ Global Health) found that populations experiencing compound humanitarian crises (conflict plus natural disaster plus food insecurity) had mental health disorder prevalence rates two to three times higher than general population norms. These mental health impacts reduce the cognitive resources available for livelihood recovery decisions, contributing to the persistence effects of El Niño events documented by Callahan and Mankin.

6.6 Water as a Weapon: Infrastructure Targeting in El Niño Contexts

The deliberate targeting of water infrastructure by armed groups in El Niño contexts represents one of the most operationally specific and analytically consequential mechanisms through which climate stress translates into security deterioration. The Tony Blair Institute for Global Change documented 40% growth in water infrastructure attacks across the Sahel between 2019 and 2024, a trend that directly correlates with both the increasing severity of drought conditions and the expanding territorial presence of jihadist groups.

The strategic logic of water infrastructure targeting is well-established in the conflict literature and has been adapted by Sahel jihadist groups into a specific governance strategy. By destroying state-operated or NGO-operated boreholes, pumping stations, and water treatment facilities, JNIM and affiliated groups accomplish three objectives simultaneously: they eliminate the evidence of state service delivery capacity, which undermines the government's legitimacy claims to the population; they create immediate water scarcity that forces civilian dependence on alternative sources that the armed group controls or influences; and they signal to armed group recruits and potential recruits that attacking state infrastructure carries no military consequence in the absence of effective government security forces.

The 2026 El Niño creates conditions in which water infrastructure targeting becomes both more strategically attractive to armed groups and more consequential for affected populations. In El Niño years, the baseline water table falls, seasonal water points dry up earlier and stay dry longer, and the distance that pastoralists and farmers must travel to access water increases. In this context, the loss of a borehole that might normally provide supplementary water to a community that has alternatives has greater impact, because the alternatives themselves are under stress. Armed groups that recognize this dynamic can use water infrastructure targeting as a precision weapon to achieve population displacement from specific areas without the cost and exposure of direct military action.

The operational response to this pattern requires coordination between humanitarian, security, and development actors that the current institutional architecture is poorly designed to provide. Water point rehabilitation and protection would ideally be integrated into conflict-sensitive programming that accounts for the risk that rehabilitated infrastructure will be targeted again unless the security environment is addressed simultaneously. The current funding siloes between WASH (Water, Sanitation, and Hygiene) programming, security sector support, and conflict prevention make this integrated approach difficult to fund or implement at scale.

6.7 The Coastal States Spillover: Benin, Togo, Ghana, Côte d'Ivoire

A development that was marginal at the time of ISDO's previous Sahel security analysis (2024) but has accelerated materially in 2025-26 is the expansion of jihadist activity into the coastal states of West Africa that had previously been insulated from the Sahel insurgency by geographic distance and stronger governance.

Benin recorded its first confirmed JNIM attack in December 2021 and by mid-2024 was experiencing attacks in the northern Alibori and Atakora departments at a rate of approximately one per week. The FDS (Forces de Défense et de Sécurité) has responded with operations that have had some tactical success but have not reversed the trend of increasing JNIM presence. More concerning for the 2026 outlook, JNIM has begun the community-engagement and food-provision activities in northern Benin that precede territorial claims in the Sahel pattern: providing food to communities in conflict-affected zones, mediating inter-communal disputes, and offering protection that the Beninois state cannot provide in remote northern areas.

Togo faces a broadly similar trajectory in its Savanes region, adjacent to Burkina Faso's most insecure areas. Ghana has experienced multiple attacks in its Upper East and Upper West regions, and the Ghanaian military has deployed forward positions to the borders with Burkina Faso and Côte d'Ivoire. Côte d'Ivoire, the most economically important of the coastal states, has experienced an escalating series of attacks in its Hambol and Poro districts since 2022.

The El Niño dimension of this spillover risk is direct. The northern regions of all four coastal states are climatically part of the Sudano-Sahelian zone, meaning they receive 600-900mm of annual rainfall that is sensitive to the same monsoon suppression that affects the core Sahel countries. Agricultural stress in northern Benin, Togo, Ghana, and Côte d'Ivoire from an El Niño monsoon deficit creates the same conditions for JNIM community engagement, recruitment from food-insecure youth, and expansion of influence that the group has exploited successfully in Mali and Burkina Faso. The 2026 El Niño therefore represents a potential inflection point at which the insurgency crosses from the established Sahel crisis zone into four countries with stronger institutions, closer EU partnerships, and more integrated economies, qualitatively changing the security landscape for the entire West Africa sub-region.

6.8 Sudan: The Worst-Case Climate-Conflict Intersection

Sudan deserves extended treatment as the country where El Niño's impact on an already-collapsing food system carries the highest near-term risk of catastrophic outcomes. With 33.7 million people in need of humanitarian assistance as of the 2026 Global Humanitarian Overview, the largest national figure globally, Sudan represents the most extreme convergence of civil war, agricultural collapse, and climate exposure.

The civil conflict between the Sudanese Armed Forces (SAF) and the Rapid Support Forces (RSF) that began in April 2023 has produced the largest displacement crisis in the world: over 9 million internally displaced and approximately 1.8 million refugees in neighboring Chad, Egypt, Ethiopia, South Sudan, and Central African Republic as of June 2026. The conflict has been particularly devastating for agriculture in Darfur, Kordofan, and Blue Nile states, which are Sudan's primary rain-fed cereal production zones. Farmers have been unable to plant in conflict-affected areas; agricultural equipment has been destroyed or looted; grain stores have been burned; and the destruction of irrigation infrastructure along the Nile in northern Sudan has reduced the winter wheat crop that normally provides the critical off-season food supply.

El Niño's Sudan signal is a suppression of the June-September rains in the Sahel belt of North Darfur, North Kordofan, and northern Blue Nile state, which are the most important rain-fed sorghum producing areas. An El Niño-driven rainfall deficit in these areas, on top of the conflict-driven disruption to agricultural activities, would eliminate the last remaining domestic production buffer in a country that has already lost access to most of its agricultural output and most of its humanitarian access routes.

The humanitarian response to Sudan's crisis is hampered by a combination of active conflict, extreme access restrictions, and catastrophically inadequate funding. The Sudan Humanitarian Needs and Response Plan for 2026 was requesting $4.2 billion; as of May 2026, it had received less than $600 million. UN emergency declarations have been issued; diplomatic pressure for access has been maintained; but the combination of active urban combat in Khartoum and El Fasher, and the RSF's systematic blockade of humanitarian convoys in Darfur, has prevented the humanitarian system from reaching the populations most at risk. An El Niño event that adds agricultural collapse to this already-catastrophic baseline creates conditions that humanitarian planners have begun to describe, in private, as beyond the absorptive capacity of the international response system.

CHAPTER 7, EXTENDED ANALYSIS

7.6 Insurance Market Implications: The Protection Gap

The gap between economic losses from El Niño events and insured losses is one of the most consequential features of the global risk landscape, particularly for developing countries. Swiss Re Institute estimates the global natural catastrophe protection gap, the difference between economic losses and insured losses, at approximately $424 billion in 2025. In emerging economies, the protection gap reaches 80-90% of total economic losses, meaning that the vast majority of El Niño-driven agricultural, infrastructure, and productivity losses in the most affected countries are borne directly by governments, businesses, and households without insurance transfer.

The implications of this protection gap for El Niño response are direct. When a strong El Niño produces economic losses in Zambia equivalent to 3% of GDP, those losses must be financed from one of three sources: domestic fiscal reserves (which Zambia has depleted), domestic borrowing (which is constrained by debt markets already stressed by the IMF restructuring), or international assistance (which arrives slowly and covers only a fraction of assessed need). Parametric insurance, as demonstrated by ARC, provides a fourth source that combines pre-agreed coverage, rapid disbursement, and explicit price signals about risk levels, but it currently covers only a tiny fraction of the potential economic loss.

The reinsurance market response to 2026 El Niño claims is worth monitoring, because it will influence premium pricing for the 2027 and subsequent risk periods. Swiss Re's global cat bond and ILS (Insurance-Linked Securities) market has grown to approximately $45 billion in outstanding bonds, with agricultural and weather-related risks representing a growing but still minority share. A series of large El Niño-related claims in 2026-27 could raise reinsurance premiums for tropical agriculture and infrastructure risks in exposed developing countries, paradoxically making the parametric insurance that serves as the best risk management tool more expensive at precisely the moment it is most needed.

The sovereign debt market provides an additional channel through which El Niño affects fiscal capacity. Zimbabwe, Zambia, and Malawi are among the countries with the most elevated sovereign credit risk in the developing world, reflected in sovereign bond spreads that exceed 1,000 basis points above US Treasuries for Zimbabwe and Zambia. El Niño events that reduce export revenue and increase public expenditure on food imports and humanitarian response will further widen these spreads, increasing the cost of any commercial borrowing and potentially triggering rating agency downgrades that restrict market access entirely. This debt-El Niño feedback loop is a mechanism through which the economic costs documented by Callahan and Mankin persist for years beyond the event's meteorological duration.

7.7 Commodity Markets: Price Discovery Under El Niño Uncertainty

Financial commodity markets began pricing El Niño risk into agricultural futures contracts from approximately March 2026, when the first clear ENSO indicators pointed to developing warm conditions in the tropical Pacific. The behavior of commodity futures markets under developing El Niño conditions is analytically interesting both for what it reveals about market expectations and for its real-world effects on food import costs in vulnerable countries.

Chicago Board of Trade (CBOT) maize futures for December 2026 delivery had risen approximately 8% from their January 2026 trough to late June, with traders citing El Niño-related Southern African crop risk for 2026/27 and the possibility of US summer drought (a minor El Niño teleconnection for the US Corn Belt in some scenarios). Chicago wheat futures showed more muted El Niño pricing, partly because the key El Niño wheat impacts (Australia, India) affect the November-December and April-May harvest periods that are beyond the standard liquid futures horizon in mid-2026.

Rice futures, which trade on the Chicago Mercantile Exchange (CME) and the Singapore Exchange (SGX), showed the largest El Niño-related price premium, with long-grain milled rice for September delivery rising approximately 12% between January and June 2026. Traders specifically cited the India monsoon deficit forecast and the memory of the 2023 export ban as primary risk factors. This rice futures premium, while reflecting genuine supply uncertainty, also has real costs for food-insecure importing countries: sovereign buyers who use futures markets to hedge import price risk must pay the El Niño premium in their hedging costs even when ultimate spot prices prove lower than feared.

The interaction between commodity futures pricing and food-insecure country import planning is a channel through which El Niño uncertainty imposes costs even when the El Niño event is ultimately weaker than feared. A government that perceives high El Niño risk and responds by pre-purchasing rice at elevated futures prices, then sees a weaker-than-forecast monsoon season that stabilizes markets, will have overpaid for its food security, but the alternative of underpurchasing and facing spot-market procurement at crisis prices is worse. This irreversibility in import planning decisions means that the expected cost of El Niño uncertainty to food-importing developing countries is higher than the expected value of the price shock itself would suggest.

CHAPTER 8, EXTENDED ANALYSIS

8.5 Anticipatory Action: From Concept to Implementation

The anticipatory action model has moved, over the past decade, from a pilot concept tested in a handful of contexts to an increasingly institutionalized feature of the humanitarian response architecture. Understanding how this transition happened, and what remains incomplete, is essential for assessing what is actually achievable in the June-September 2026 pre-peak window.

The intellectual origins of anticipatory action lie in the early 2000s work on humanitarian risk financing by the Start Network (then the Disasters Emergency Committee) and the Red Cross Red Crescent Movement's Forecast-Based Financing program. The key conceptual insight, articulated by WFP researcher Lola Gostelow in a 2011 report on anticipatory humanitarian action, was that the primary constraint on early response was not the absence of early warning information (which existed for famines, droughts, and floods) but the absence of pre-committed, trigger-based financing that could be released without requiring a new assessment, funding appeal, and donor decision cycle each time a threshold was crossed.

The German Humanitarian Assistance and ECHO (European Civil Protection and Humanitarian Aid Operations) provided early funding for pilot programs in Bangladesh (cyclone anticipatory action, 2016), Ethiopia (drought, 2017), and Mongolia (dzud cold spell, 2018). These pilots established the core operational model: a pre-agreed "early action protocol" defining specific trigger conditions (meteorological thresholds, IPC phase classifications, or combined indicators), specific pre-agreed actions (cash transfers, livestock destocking, seed distribution), and pre-committed financing released automatically when triggers are met. Evaluations of these early programs (ODI, 2020; Bailey and Harvey, 2017, World Development) consistently found that anticipatory action reduced food security deterioration and asset loss relative to control groups receiving equivalent assistance after the event.

Scaling from pilots to systematic programs has been the challenge of the past five years. The UN Secretary-General's 2021 initiative on anticipatory action set a target of 50% of humanitarian crises being covered by pre-agreed anticipatory action frameworks by 2025; progress toward this target has been made but coverage remains far below 50%. The key constraints have been: financing (pre-committed funding is harder to secure than reactive funding because donors are asked to make commitments before crises materialize); operational capacity (NGO partners in fragile contexts may not have the systems to implement complex conditional programs rapidly); and data gaps in some contexts where the early warning systems required for trigger management are absent or unreliable.

The FAO/WFP Joint Anticipatory Action Appeal of June 2026 represents the most ambitious attempt yet to institutionalize anticipatory action at scale for an El Niño event. Its design incorporates lessons from the previous El Niño pilots: it is structured as a joint appeal (eliminating inter-agency competition for funding), it explicitly identifies triggers for each of the 22 priority countries, and it is launched at the point in the event cycle when forecast confidence is highest and the pre-peak action window is still open. Whether it secures full funding by the end-August 2026 deadline identified as optimal in the analysis of Chapter 9 will be a serious test of whether the institutional advocacy of the past decade has translated into genuine donor behavior change.

8.6 Lessons from the 2023-24 Anticipatory Action Programs

The 2023-24 El Niño event, which preceded the current one by approximately three years, provides the most recent large-scale test of the anticipatory action model. FAO and WFP reached a combined 3-6 million people through anticipatory action programs in 2023-24, primarily in Southern Africa, the Horn of Africa, and parts of the Dry Corridor. A systematic review of these programs, conducted by the Anticipation Hub in late 2024, provides the most current evaluation evidence available.

The review found that anticipatory action programs reached beneficiaries an average of 3.5 months before the peak of the crisis, compared to approximately 8 months after peak for equivalent reactive response programs in the same contexts. This timing advantage translated into measurably better food security outcomes: households receiving anticipatory assistance showed 28% lower rates of livelihood asset depletion and 19% lower rates of negative coping strategy adoption (distress asset sales, reduced meal frequency, withdrawal of children from school) compared to matched control households receiving late assistance.

The economic returns were quantified for a subset of programs in the Horn of Africa, where the combination of livestock protection (providing veterinary care, fodder, and water access before drought-induced mortality) and food vouchers showed a cost-benefit ratio of approximately 2.3:1 to 3.3:1, consistent with the broader literature on drought anticipatory action returns. The highest-return component was livestock protection, where the difference in asset value preserved per dollar invested was dramatically higher than for food transfers alone.

The review also identified persistent implementation challenges. First, trigger timings were not always well-calibrated to operational lead times: in several cases, trigger conditions were met only 4-6 weeks before crisis peak, leaving insufficient time for full program implementation. The implication for 2026 is that triggers should be set conservatively (at lower thresholds), accepting the risk of some false alarms in exchange for ensuring that the operational window is long enough for meaningful intervention. Second, coordination between FAO agricultural programming and WFP food assistance was often ad hoc rather than systematic, with gaps in coverage of populations who did not fall neatly within either agency's standard programming mandates. The joint nature of the 2026 appeal is designed to address this gap, but operational coordination will require active management.

CHAPTER 9

9. Policy Recommendations

This chapter presents ISDO's policy recommendations organized across three time horizons. The recommendations are grounded in the analytical findings of Chapters 3–8 and prioritized by the combination of expected impact, time-sensitivity, and political feasibility. They are addressed to a composite audience: national governments of affected and donor countries, multilateral institutions (UN agencies, the World Bank, IMF, and regional development banks), the European Union and G7, humanitarian practitioners, and the private sector (particularly the insurance industry and agricultural commodity market participants).

A critical framing point bears repeating: this report has documented that the three primary response domains, food security and humanitarian response, conflict prevention, and migration management, are mutually interdependent. A response that addresses only one domain while neglecting the others will be systematically less effective. The policy recommendations below reflect this interdependence explicitly.

ESCALATION THRESHOLDS: WHEN TO INTENSIFY ALL RECOMMENDED ACTIONS

The following meteorological and food security signals should serve as trigger points for immediate escalation of all recommended actions to their maximum intensity:

→ Meteorological: Niño 3.4 SST anomaly ≥ +2.0°C on the 3-month running mean (Very Strong event confirmed)

→ West Africa: West African Monsoon onset confirmed >2 weeks late by ICPAC (July 2026 seasonal assessment)

→ Food markets: FAO All Rice Price Index rising >15% quarter-on-quarter

→ Southern Africa: October–December 2026 seasonal forecast confirmed below-normal from SAWS/ICPAC

→ Sahel: IPC Phase 4 (Emergency) population rising above 2.5 million in Cadre Harmonisé update

→ Governance: Any third-generation coastal West African state (Benin, Ghana, Togo, Côte d'Ivoire) experiencing an armed jihadist attack claiming IS or JNIM affiliation

Activation of any TWO of these thresholds simultaneously should trigger an emergency convening of the G7 Development and Foreign Ministers and UN Emergency Relief Coordinator within 10 working days.

9.1 Immediate Actions (June–September 2026)

The June–September 2026 period is the most time-sensitive window for anticipatory action. Agricultural planting calendars, livestock destocking timelines, and social protection mechanisms all have lead-time requirements that make action in this window qualitatively different from (and more valuable than) equivalent action in October or beyond. The recommendations in this section require policy decisions and financing commitments within weeks, not months.

Recommendation 1: Fully Fund the $202 Million FAO/WFP Joint Anticipatory Action Appeal

Priority: Critical. Lead actors: G7 governments, EU, Gulf Cooperation Council member states, bilateral donors.

The single highest-return intervention available in the June–September 2026 window is full funding of the FAO/WFP Joint Anticipatory Action Appeal. With documented returns of up to $7 per $1 invested (FAO Deputy Director-General Beth Bechdol, June 2026), and with trigger-based financing windows for the critical agricultural planting, livestock protection, and social protection activities closing within months, delay is directly costed in human lives and asset losses.

Benchmark: Achieve full funding by end-August 2026. If 60% is not reached by that date, G7 donors should collectively authorize emergency reallocation from contingency humanitarian reserves (CERF, individual donor contingency funds) to cover the shortfall. The $202 million requested represents approximately 0.9% of the 2026 Global Humanitarian Overview target, a share so modest that its non-funding would represent a profound institutional failure of donor prioritization rather than a resource constraint.

The 22 priority countries covering 8.8 million people represent only the most acute first-tier caseload. The appeal's own technical annex acknowledges this: the Agricultural Stress Index identifies 41 countries and territories requiring external food assistance, of which 22 were selected as priorities on the basis of a scoring system weighting El Niño teleconnection intensity, current IPC status, government response capacity, and pre-existing FAO/WFP operational presence. The remaining 19 countries face a genuine risk of not receiving any anticipatory support despite documented vulnerability. ISDO recommends that donors simultaneously authorize an additional contingency envelope of $150–200 million, to be released in two tranches: the first in September 2026 when the very strong event classification is expected to be confirmed, the second in January 2027 when the Southern African season onset can be assessed, for extension of coverage to the second-tier vulnerable population. The cost-effectiveness case for this additional envelope is identical to the primary appeal: anticipatory action returns $5-7 per dollar invested across all documented program types, and the second-tier countries face structurally similar vulnerabilities to the 22 already identified. The mechanism already exists in the form of the FAO/WFP anticipatory action program management infrastructure. What is missing is the pre-committed financing.

Recommendation 2: Pre-Position Sovereign Parametric Risk Insurance

Priority: Critical. Lead actors: African Development Bank (AfDB), World Bank, ARC Agency, G7 bilateral donors.

The ARC payout mechanism for Zimbabwe ($31.8 million, 2024) demonstrated that parametric index insurance can deliver sovereign fiscal support in weeks rather than months. ISDO recommends that G7 governments and the World Bank co-finance the extension of ARC coverage to all major SADC countries not yet covered, with policies in force before the October 2026 southern hemisphere spring planting season. Priority countries: Malawi, Mozambique, Namibia, Madagascar (in addition to existing Zimbabwe, Zambia coverage renewal).

Analogous parametric mechanisms should be developed or extended for key Sahel states, though doing so is considerably more complex than extending SADC coverage. The combination of high political risk in three Sahelian states under military governments with suspended ECOWAS membership, low premium-paying capacity where all three states have per-capita GNI below $650, international sanctions restricting financial flows to Niger, and a humanitarian funding environment that is structurally short of resources makes standard ARC enrollment near-impossible through normal channels. The World Bank's Crisis Risk Financing initiative and the African Development Bank's Disaster Risk Finance program both have mechanisms for concessional premium financing in fragile states, but neither has been operationalized at the scale required for the Sahel given the governance complexities. ISDO recommends a pragmatic interim approach: rather than attempting to enroll fragile Sahel states in full ARC membership within the available timeframe, the World Bank should pre-authorize a $50 million contingency credit line for each of Mali, Burkina Faso, and Niger that can be released through an agreed parametric trigger when an IPC Phase 4 or equivalent threshold is confirmed. This would not provide the full benefits of a proper parametric insurance mechanism, but it would provide the rapid-disbursement, trigger-based financing that is the operational core of the parametric model, at a scale the affected populations genuinely require.

Benchmark: All high-risk SADC states with material hydropower or rain-fed agriculture dependence should have confirmed ARC or equivalent parametric coverage in force before October 1, 2026. The October 1 deadline is not arbitrary, it corresponds to the expected onset of El Niño influence on the Southern African austral spring, and parametric policies must be in force before trigger conditions materialize in order to pay out. A policy purchased in November 2026, after rainfall deficits are already being recorded, will not cover the losses already incurred. The ARC mechanism's underwriting timeline requires approximately 6-8 weeks from policy negotiation to confirmation; given that negotiations must involve national treasuries, the ARC Board, and reinsurance partners, the real deadline for initiating conversations is early August 2026. Donors who wish to co-finance premium subsidies must authorize those funds before that date. The cost of ARC premium subsidies for a full SADC regional portfolio, Zimbabwe, Zambia, Malawi, Mozambique, Madagascar, Namibia, Botswana, is estimated at approximately $18-25 million per season, against potential payout liability of $150-300 million in a severe event scenario.

Recommendation 3: Activate Forecast-Based Financing Pipelines in the Sahel and Horn

Priority: High. Lead actors: CERF, Regional Humanitarian Funds (OCHA), FAO, WFP, ICPAC/GHACOF.

Central America's June 2026 CERF disbursement ($4 million, triggered when forecasts confirmed a rainfall shortfall) demonstrates the operational viability of forecast-based financing at scale. This model should be immediately replicated in the Horn of Africa, where ICPAC/GHACOF provides the equivalent seasonal climate forecasting infrastructure, and in the Sahel, where FEWS NET provides the early warning foundation.

Operationalizing a trigger-based disbursement mechanism in the Sahel before the peak of the 2026 El Niño requires three steps that must happen in parallel rather than sequentially. The first is technical: definition of specific trigger conditions in collaboration with FEWS NET (for food security classification thresholds) and ICPAC (for meteorological rainfall anomaly triggers), expressed in measurable, publicly available indicators that a CERF disbursement officer can verify without discretionary judgment. The 2026 CERF disbursement for Central America used a single rainfall anomaly trigger (actual June rainfall below 70% of the long-period average in three consecutive dekads, as measured by CHIRPS satellite data), simple, verifiable, and fast to process. The Sahel equivalent might use a two-trigger system: ICPAC June-August seasonal forecast confirming below-40th-percentile rainfall probability for the western Sahel, AND FEWS NET Cadre Harmonisé projection confirming IPC Phase 3+ above 45 million people. Using two triggers reduces false alarm probability while maintaining early action capability. The second step is political: a CERF Emergency Director decision, confirmed by donor governments on the CERF Advisory Board, pre-authorizing a disbursement of $15-25 million to activate when the trigger conditions are met. This pre-authorization exists as a mechanism within CERF's governing rules; it simply requires political decision. The third step is operational: pre-negotiated rapid-onset programs with FAO, WFP, and UNICEF implementing partners in each of the priority Sahel countries, designed to mobilize within 21 days of trigger confirmation. The programs should include only those activities, early cash transfers, seed procurement, livestock feed pre-positioning, that can meaningfully change outcomes at the time of implementation rather than post-crisis activities that would be better funded through reactive channels. The technical work for all three steps can be completed by mid-August 2026 if the political decision to prioritize it is made in July. That is the timeline constraint.

Recommendation 4: Issue a G20 Early Warning Alert on Food Price Risks

Priority: High. Lead actors: G20 Presidency (South Africa holds in 2026), AMIS/FAO, G7 Agriculture Ministers.

AMIS should convene an extraordinary session of G20 Agriculture Ministers in July–August 2026, specifically to: (a) review the El Niño forecast and its commodity market implications; (b) secure informal but public standstill commitments from major agricultural exporters against new export restrictions pending seasonal outcome data; and (c) activate AMIS's enhanced monitoring protocol for rice, wheat, maize, and sugar, with monthly public reporting on supply and pricing indicators through March 2027.

This recommendation does not require legal commitments or formal treaty amendment. Its power is normative, and normative power in trade policy is sometimes underestimated: the 2007-08 food price crisis produced a wave of unilateral export restrictions partly because no coordination mechanism was in place to signal collective costs or create reputational accountability for unilateral action. The AMIS mechanism established after that crisis created exactly this kind of accountability forum, and the 2010-11 crisis, while severe, did not produce the same cascade of export restrictions, in part because major exporters had committed to transparency under AMIS. The 2023 India rice ban demonstrated that AMIS's non-binding commitments are insufficient when domestic political pressure is intense. What a July 2026 G20 Agricultural Ministers' statement would add is timing: a public commitment made before any specific country is under domestic price pressure is harder to walk back than a commitment made in response to an already-developing domestic crisis. The South African G20 Presidency has shown interest in food systems issues and has the institutional positioning to convene such a meeting; ISDO recommends that donor governments with influence over the South Africa Presidency agenda actively advocate for this convening in early-to-mid July 2026, when the El Niño forecast uncertainty is still high enough that a preventive commitment is framed as risk management rather than crisis response, framing that is politically easier for all participants to accept.

9.2 Medium-Term Actions (Through the 2026/27 Agricultural Season)

Recommendation 5: Guard Against Trade Policy Contagion

Priority: High. Lead actors: WTO, G7 Trade Ministers, AMIS, EU Trade Commissioner.

The 2023–24 India rice export ban demonstrated how unilateral trade policy responses to domestic supply concerns amplify global price spikes to degrees that dwarf the original production shortfall. ISDO recommends an emergency agricultural trade ministers' meeting before November 2026, when the Northern Hemisphere is entering the peak of the El Niño impact season, to secure a collective standstill commitment against new export restrictions on staple food commodities.

The legal instrument for formalizing such a commitment remains under debate (WTO Agricultural Safeguards, Article XI exceptions, etc.). ISDO recommends pragmatism over perfect legality: a coordinated political declaration by G7 + Australia + India + major ASEAN exporters, even without legal enforceability, would substantially reduce the probability of the contagion episode that the 2023 India ban exemplified. The political achievement of getting India to make such a declaration, which requires diplomatic investment now, is the highest-value single diplomatic action available.

Benchmark: A coordinated declaration from G20 major agricultural exporters, adopted before December 1, 2026, committing to extraordinary transparency and bilateral consultation before implementing any export restrictions during the 2026/27 El Niño event cycle. The December 1 date reflects the harvest calendar: the Northern Hemisphere wheat and rice harvests will be complete by October-November, and the Southern Hemisphere maize harvest begins in February-March 2027, meaning that the December 2026 period is when governments will have the clearest picture of their domestic supply situation and when export policy decisions for the 2027 trading year are typically made. A commitment secured in December, before domestic supply assessments trigger policy reflexes, has more preventive value than one secured in January after preliminary harvest data has already shaped domestic price expectations. The declaration should at minimum include: a 30-day advance notice requirement before any export restriction takes effect, with simultaneous notification to AMIS and the WTO Agriculture Committee; a requirement for public disclosure of the domestic market data underlying the restriction decision; and an explicit commitment to maintain humanitarian export channels (food aid contracts, WFP and FAO procurement) even if commercial exports are restricted. None of these requirements prohibits export restrictions, they are not asking governments to surrender a policy tool that domestic politics requires them to retain, but they create a notification and consultation window in which AMIS, WFP, and bilateral diplomatic channels can exercise preventive influence before a ban creates a market shock.

Recommendation 6: Emergency Diversification of Southern African Power Grids

Priority: High. Lead actors: AfDB, World Bank, SAPP, bilateral energy finance institutions.

The Zambia-Zimbabwe 21-hour load-shedding precedent should not be allowed to repeat. ISDO recommends fast-track financing for emergency solar-plus-battery installations at critical public facilities (hospitals, water pumping stations, cold storage for agricultural produce) in Zambia, Zimbabwe, and Malawi, with disbursement timelines targeting commissioning before the austral summer of 2026/27.

Specifically: (a) The AfDB should activate its $500 million Emergency Energy Transition Facility for Southern Africa, approved in principle in May 2026, with fast-track procurement procedures that compress the standard 18–24 month procurement timeline to 6–9 months; (b) SAPP's grid interconnection projects, particularly the Zambia-Tanzania and Mozambique-Zimbabwe transmission capacity additions, should receive accelerated processing from national regulatory bodies; (c) Zambia's government should immediately activate the Kafue Gorge Lower

Hydropower Station (750 MW), which requires lower minimum lake levels than Kariba and can provide partial buffer.

Recommendation 7: Ring-Fence Conflict-Sensitive Humanitarian Assistance in the Sahel

Priority: High. Lead actors: WFP, FAO, UNICEF, UNHCR, EU ECHO, USAID.

In contexts where JNIM and IS-Sahel exploit food and water scarcity for territorial control and recruitment, the design of humanitarian assistance is itself a security policy tool, and one that humanitarian actors have historically been reluctant to acknowledge as such, out of concern that "securitizing" humanitarian response compromises the humanitarian principles of neutrality and independence. This reluctance is understandable but, in the specific Sahel context of 2026, may be counterproductive. JNIM does not treat humanitarian assistance as neutral. It actively interdicts it when delivered by government-aligned or international actors, taxes it when it passes through territory it controls, and substitutes its own parallel distribution when it can credibly do so and take the credit. In this operating environment, a humanitarian program that is genuinely neutral in its delivery, using cash transfers directly to beneficiaries via mobile money rather than in-kind food distributed at central points, working through community water governance structures rather than centralized boreholes that are easier to destroy or control, and avoiding large-scale logistics hubs that create visible supply chains JNIM can interdict, is not just more efficient. It is itself a form of denying JNIM a tactical advantage. ISDO therefore recommends that humanitarian coordination in the Sahel adopt conflict-sensitivity standards that specifically address the food-and-water-as-weapon dynamic, including: mandatory pre-assessment of JNIM presence and influence patterns before selecting distribution modalities; systematic preference for cash and voucher assistance over in-kind food delivery in markets with adequate functionality; technical support to communities seeking to rehabilitate and diversify water infrastructure so that no single borehole becomes a critical dependency; and post-distribution monitoring designed to detect taxation or diversion at the beneficiary level rather than just at the convoy level. None of this requires humanitarian actors to take sides in the conflict. It requires them to take account of the fact that the conflict is already taking sides in humanitarian delivery.

Operationally: (a) Prioritize direct-to-beneficiary cash and voucher assistance (CVA) over in-kind food distribution where market functionality allows, CVA bypasses physical distribution points that armed groups can control, tax, or disrupt; (b) Support community-led water governance structures that reduce dependence on centralized infrastructure that JNIM targets for destruction; (c) Where in-kind distribution is required, use multiple small distribution points rather than central hubs, reducing the signature that armed groups can interdict; (d) Condition humanitarian presence negotiations on population protection guarantees where armed groups are the de facto authority.

9.3 Structural Resilience Investments (2026-2030)

Recommendation 8: Scale Drought-Tolerant Crop Systems and Water Harvesting

Priority: Medium-High. Lead actors: CGIAR, national agricultural research systems, AfDB, bilateral donors.

The fundamental vulnerability of Sahelian and Southern African food systems is their dependence on single-season rain-fed agriculture in zones where El Niño-driven rainfall variability is climatologically predictable and recurring. A portfolio of investments that collectively reduce this dependence represents the most cost-effective long-term El Niño resilience strategy. ISDO recommends priority investment in:

- Drought-tolerant, short-cycle crop variety deployment: CGIAR-developed drought-tolerant maize (DTMA varieties, developed in collaboration with IITA and CIMMYT) and short-cycle millet and sorghum varieties adapted to Sahel conditions are available but require agricultural extension investment to reach smallholder farmers at scale. Target: 30% of Sahel cereal area planted with climate-adapted varieties by 2030.
- Water harvesting and smallholder irrigation: Half-moon (demi-lune) water harvesting, zai pits, and sand dams have demonstrated 40–100% yield improvements in comparable settings (SWAC/OECD, 2020; WOCAT database). These investments require initial technical assistance and subsidy but are maintained by communities

after establishment. Target: 5 million additional hectares under improved water management by 2030 in Sahel and Southern Africa.

- Livestock water point development: Boreholes, solar-powered pumps, and earthen dams for livestock water access in pastoral zones reduce the distance animals travel for water during dry periods, reducing weight loss and mortality. These are particularly important in areas where JNIM has destroyed existing water infrastructure, reconstruction of destroyed infrastructure combined with diversification to reduce single-point vulnerability.

Recommendation 9: Institutionalize Anticipatory Action Financing

Priority: Medium-High. Lead actors: OCHA, World Bank IDA, bilateral donors, national finance ministries.

The current operational model for anticipatory action financing has a structural defect that no amount of individual donor generosity can fully overcome. When FAO and WFP launch an anticipatory appeal in June 2026, they are asking donors to make a political decision, authorizing new spending, at a time when the crisis has not yet materialized and when the humanitarian case is therefore harder to argue than it will be in six months when malnutrition rates are rising and deaths are being reported. The psychology of humanitarian funding consistently favors visible crisis over forecast risk, and no amount of cost-benefit analysis demonstrating $7 returns per dollar invested has fully overcome this bias at the level of parliamentary appropriations processes in donor capitals. The result is that anticipatory action, despite being better-evidenced and more cost-effective than reactive response, consistently arrives later and with less funding than reactive response in the same crises. Fixing this requires institutional architecture change, not just better advocacy. The three reforms ISDO recommends are designed to remove the need for a new political decision each time an El Niño forms, replacing it with pre-committed structures that disburse automatically when pre-agreed scientific thresholds are met:

1. National El Niño contingency budget lines: Finance ministers in high-risk ENSO countries (Zimbabwe, Zambia, Malawi, Ethiopia, Somalia, Guatemala, Honduras) should establish dedicated contingency budget lines, pre-approved by parliament, for El Niño response that can be released within 30 days of a declared El Niño onset, without requiring a supplementary budget appropriation.
2. World Bank IDA Crisis Response Window pre-commitment: The World Bank's Crisis Response Window (CRW) within IDA provides fast-disbursing grants and credits for disaster response. ISDO recommends that the World Bank Board pre-authorize a CRW allocation for El Niño response, potentially activated automatically when IRI assigns >80% probability of a Strong El Niño, eliminating the Board authorization delay that currently adds 3–6 months to response timelines.
3. Multi-year anticipatory action trust funds: Donors should transition from ad-hoc contributions to El Niño appeals toward multi-year voluntary contributions to dedicated anticipatory action trust funds at FAO and WFP, providing advance financing that is pre-deployed rather than raised in response to specific events. The El Niño is predictable; the financing should be pre-positioned accordingly.

Recommendation 10: Invest in the Southern African Power Pool Interconnection

Priority: Medium. Lead actors: AfDB, World Bank, bilateral energy finance institutions (Proparco, DEG, BII).

The Kariba crisis demonstrated that Zambia and Zimbabwe's exclusive dependence on a single shared reservoir for the majority of their electricity generation is a systemic vulnerability. The solution, regional grid interconnection that allows electricity to flow from surplus-generating areas to deficit areas during drought, is a long-documented need that has advanced slowly due to financing constraints and cross-border regulatory complexity.

ISDO recommends that the 2026 El Niño crisis serve as the political catalyst for accelerated investment in: (a) the Zambia-Tanzania interconnector (approx. $800 million, under development), which would allow Zambia to import Tanzanian surplus hydropower (generated from less drought-sensitive northern catchments) during Southern African dry seasons; (b) solar PV expansion in Zimbabwe and Zambia to provide base-load generation that is not hydropower-dependent; and (c) regional coordination mechanisms under SAPP that allow automatic load-sharing when any single national system falls below 70% generation capacity.

CHAPTER 10

10. Conclusions

The El Niño now forming in the tropical Pacific is not a future threat. It is a present and accelerating reality, confirmed by the full range of operational meteorological centers, expressing itself in current SST anomalies and subsurface heat content levels that make a strong-to-very-strong event highly probable for the September–December 2026 peak period. Its humanitarian, economic, and security consequences will unfold across multiple regions simultaneously, with cascading interactions between agricultural shocks, commodity price transmission, displacement dynamics, and conflict escalation that no single agency or government has the mandate (or the capacity) to manage in isolation.

The El Niño now forming in the tropical Pacific is not a future threat. It is a present and accelerating reality, confirmed by the full range of operational meteorological centers, expressing itself in current SST anomalies and subsurface heat content levels that make a strong-to-very-strong event highly probable for the September-December 2026 peak period. This assessment has documented three structural patterns that define the nature of the 2026 El Niño challenge, and that must inform the design of any adequate response. They are not three independent observations. They are a system.

10.1 Three Structural Patterns

Pattern One: The Compounding Crisis Strikes a System in Motion

The 2026 El Niño does not arrive at a neutral or recovering system. The populations most exposed to its impacts, in the Sahel, Southern Africa, the Horn of Africa, and Central America, are already at or near the limits of their adaptive capacity after years of overlapping climate shocks, conflict, economic disruption, and institutional erosion. The 2023–24 El Niño was the worst Southern African drought in a century; the Sahel is recording its highest-ever food insecurity figures before the 2026 event has even peaked; Somalia has sustained four severe drought episodes in five years; and the Kariba Dam has not fully recharged before the next drought season begins.

This pattern has a critical policy implication: the marginal humanitarian cost of the 2026 event, the additional suffering attributable to El Niño above the counterfactual baseline, is superimposed on populations whose capacity to absorb additional shock is already exhausted. The analogy that comes to mind is a patient who has not recovered from the previous illness before being exposed to the next pathogen, but it is an imperfect analogy because it implies a degree of passivity that the evidence does not support. The populations at risk in the Sahel, the Horn, and Southern Africa are not passive victims of El Niño. They are communities that have adapted to rainfall variability for centuries, that have developed intricate livelihood systems precisely to manage climate risk, and that have repeatedly demonstrated resilience under conditions that would overwhelm populations with more material resources. What has changed is the frequency and severity of shocks, and the progressive destruction of the asset base, the livestock herds, the soil fertility, the social safety networks, that have historically allowed those adaptive systems to function. The appropriate response is not to wait until the clinical presentation has deteriorated and intervene after the crisis becomes visible; it is to recognize that the crisis is already developing and invest in the anticipatory mechanisms that the evidence consistently shows are both more humane and more cost-effective than their reactive alternatives. This is not a novel argument. It has been made in every El Niño review since 1997. The question of whether it will be acted upon in 2026 is therefore not primarily a question about evidence or analysis. It is a question about political will.

Pattern Two: The Information Infrastructure Is Ready; the Financing Is Not

Perhaps the most important (and most frustrating) finding of this report is that the gap between what is known and what is done has never been wider, while the gap between what the evidence supports and what the financing provides has never been wider. The early warning architecture available for El Niño monitoring, FEWS NET, GIEWS, IPC, ICPAC/GHACOF, GEOGLAM, the ENSO monitoring centers, provides converging signals of exceptional clarity and advance notice. The operational mechanisms for translating that knowledge into humanitarian protection, anticipatory action frameworks, parametric insurance, forecast-based financing, are proven and functioning. The cost-effectiveness ratios are among the highest available in the development finance toolkit. And yet the funding pipeline is slower, less certain, and more politically constrained than at any point in the past decade.

This is an institutional failure, not a knowledge failure or an operational failure. It represents a misallocation of international attention and resources that will cost far more, in human suffering, in economic losses, in security deterioration, and in the costs of reactive emergency response, than the anticipatory investment that would have prevented it. ISDO's primary institutional recommendation from this report is for the donors and multilateral institutions that comprise the global humanitarian system to acknowledge this structural mismatch explicitly and begin the reforms, national contingency budgets, World Bank CRW pre-commitments, multi-year anticipatory trust funds, that would correct it.

Pattern Three: Food Security, Migration, and Security Are One Interconnected System

The analytical architecture of the international response system still, in 2026, treats food security, migration, and security as separate mandates managed by separate agencies with separate budgets and separate accountability structures. The FAO manages food security. IOM and UNHCR manage displacement. UNDP and national governments manage conflict prevention. These distinctions have administrative logic, but they are analytically and operationally wrong for the El Niño context.

This report has documented, in chapter-level detail, that: El Niño-driven food insecurity is a primary driver of migration decisions; migration pressure intensifies political tensions in receiving states; political tensions produce border management policies that divert migration flows to more dangerous routes, increasing mortality; mortality and displacement disrupt remittance flows to source communities; remittance disruption worsens food security in source communities; food insecurity in source communities expands the recruitment pool for jihadist organizations; jihadist expansion destroys agricultural infrastructure; and destroyed agricultural infrastructure worsens food insecurity. This is a closed loop, and an intervention at any single point that does not also address the adjacent nodes will be partially or wholly absorbed by the system without breaking the cycle.

The ISDO Multi-Domain Risk Assessment framework, applied throughout this report, is one analytical response to this integration challenge. But analytical frameworks do not build coordination mechanisms. The organizational response, which requires genuine institutional architecture changes that are beyond the scope of any analytical report, is the longer-term imperative that the El Niño 2026 event once again brings into sharp relief. There is a specific institutional design question that the evidence of this report suggests deserves urgent attention: whether the three-agency structure (FAO for agriculture, WFP for food assistance, UNHCR/IOM for displacement) that governs the international response to food crises, migration, and displacement is adequate to address a crisis in which these three domains are structurally interdependent rather than parallel. The FAO/WFP Joint Anticipatory Action Appeal is a step toward cross-agency integration, and a welcome one. But it does not address the migration-security nexus that this report documents in the Sahel and Horn corridors, nor does it integrate the conflict-sensitive programming that the JNIM food-and-water-as-weapon dynamic requires. The case for a dedicated, multi-agency El Niño response architecture, modeled on the successful precedent of the COVID-19 ACT-Accelerator with its cross-domain coordination mechanism, is strong enough that ISDO will pursue it as a formal policy proposal in a forthcoming institutional brief.

10.2 The Window of Opportunity

ISDO concludes this assessment with a statement about timing that is simple, verifiable, and important. The policy window for effective anticipatory action in the 2026 El Niño cycle, the period in which intervention costs are lowest and effectiveness is highest, is open now, in July 2026, and will narrow substantially by September 2026 and close largely by December 2026. After December, the event will have already delivered much of its humanitarian, economic, and security impact.

The decisions made, and the resources mobilized or withheld, in the next eight weeks will define the humanitarian outcomes of 2026–2027 for tens of millions of people in the most vulnerable regions on Earth. The analytical case for action is established by this report and by the broader body of evidence it draws on. The operational mechanisms for action are proven and available. The cost-effectiveness case for action is stronger than for virtually any alternative use of comparable resources. What remains is the political decision to act before the crisis is visible, rather than after it is unavoidable.

The decisions made, and the resources mobilized or withheld, in the next eight weeks will define the humanitarian outcomes of 2026-2027 for tens of millions of people in the most vulnerable regions on Earth. The analytical case for action is established by this report and by the broader body of evidence it draws on, from Hsiang et al.'s climate-conflict correlations to Callahan and Mankin's trillion-dollar loss attributions to FAO and WFP's seven-dollar returns on anticipatory investment. The operational case has been made by the practitioners who designed and implemented the 2023-24 anticipatory action programs, recovered the evidence from them, and built it into the Joint Anticipatory Action Appeal now awaiting funding. The cost of inaction is calculable, it has been calculated, and it runs into hundreds of millions in avoidable humanitarian losses for every week the anticipatory window closes without adequate response. ISDO has no illusions about the constraints donor governments face: real fiscal pressures, competing humanitarian priorities, and domestic political environments that do not reward spending on preventing crises that have not yet become visible to their publics. Those constraints are real. They are also, in the context of what the evidence shows about the returns to anticipatory action, insufficient justification for failing to act. The International Sustainable Development Observatory calls on the governments, multilateral institutions, and humanitarian actors with the capacity to act to do so, in the June-September 2026 window, with the urgency and at the scale that the evidence warrants. The window is open now. It will not be open indefinitely.

ANNEX A

Annex A: Key Data Tables

A.1 El Niño Intensity Classification and Historical Reference

Intensity Class	ONI Threshold (3-month avg)	Recent Events	Peak Season	Typical Economic Loss Range
Weak	+0.5°C to +0.9°C	2004-05, 2006-07, 2018-19	NH winter	$0.2–0.8T cumulative (limited regional impacts)
Moderate	+1.0°C to +1.4°C	2002-03, 2009-10, 2014-15	NH winter	$0.8–2.0T cumulative
Strong	+1.5°C to +1.9°C	1986-87, 2023-24	NH winter	$2.0–4.0T cumulative
Very Strong	≥ +2.0°C	1982-83, 1997-98, 2015-16	NH winter (Nov–Jan)	$3.9–5.7T cumulative (Callahan & Mankin, 2023)
2026 (forming, July 2026)	+1.7°C mid-Jun (rising); 63% chance ≥2.0°C (NOAA)	Forming, peak: Sep–Dec 2026	Nov–Jan 2026–27	$3–7T (Citigroup GPS 2026, base–super scenarios)

Table A.1: *ENSO intensity classification and historical economic reference. Economic loss ranges: Callahan & Mankin (2023, Science); Citigroup GPS (2026). Note: Economic loss estimates are cumulative 5-year figures in 2026 USD equivalents.*

A.2 Global Acute Food Insecurity Hotspots, IPC Phase 3+, June 2026

Country/Region	People IPC Phase 3+ (millions)	Peak IPC Phase	Primary Driver (2026)	El Niño Exposure	In FAO/WFP Appeal
Nigeria (priority states)	25.0+	Phase 4 (NE)	Conflict; poverty; inflation	High	Yes
Sahel (15 countries, lean season)	52.8 (projection)	Phase 4 (localized)	Conflict; drought; structural poverty	Very High	Yes (Cameroon, Nigeria included)
Sudan	33.7 in need	Phase 5 (Cat.) localized	Civil war; displacement	Moderate-High	Yes
Ethiopia	20.0+	Phase 4	Drought; conflict; displacement	High	Yes
Somalia	7.1	Phase 4	Drought; conflict	Very High	Yes
Yemen	17.0	Phase 4	Conflict; economic collapse	Moderate	Partial

Country/Region	People IPC Phase 3+ (millions)	Peak IPC Phase	Primary Driver (2026)	El Niño Exposure	In FAO/WFP Appeal
Afghanistan	14.0	Phase 4	Governance; economic collapse	Moderate	Yes
Zimbabwe	5.0+ (projected Oct 2026)	Phase 3-4 (Oct 2026)	El Niño drought; fiscal crisis	Critical (Oct 2026)	Yes
Haiti	5.83	Phase 4 (1.8M)	Gang violence; economic collapse	Compounding	No
Guatemala (Dry Corridor)	3.0+	Phase 3	Drought; poverty; El Niño	High (current)	Yes
Pakistan (exposed districts)	8.0+	Phase 3	Drought; economic fragility; post-2022 floods	High	Yes

Table A.2: *Global acute food insecurity hotspots as of June 2026. IPC Phase 3+ populations from most current IPC/CH analyses. El Niño exposure reflects 2026/27 forecast intensity. "In FAO/WFP Appeal" = explicitly included in the June 18, 2026 Joint Anticipatory Action Appeal. Sources: IPC Global Network; Cadre Harmonisé; FAO GIEWS; FEWS NET; FAO/WFP Joint Appeal (June 2026).*

A.3 ARC 2023–24 Drought Payouts by Country

Country	ARC Payout (USD)	Households Supported	Districts Covered	Payout Timeline	Notes
Zimbabwe	$31.8 million	508,435	27 districts	Within 5 weeks of trigger	Largest single ARC payout in mechanism history; used for cash transfers and food assistance
Zambia	$13.3 million	Est. 175,000	Multiple provinces	Within 6 weeks of trigger	Southern and Eastern Provinces most affected; cash transfers primary modality
Malawi	$11.6 million	Est. 150,000	Southern Region	Within 5 weeks of trigger	Combined with WFP programming; tobacco farming regions hardest hit
Mozambique	$5.5 million	Est. 70,000	Southern Mozambique	Within 7 weeks of trigger	Smaller payout reflecting lower policy coverage relative to need
TOTAL 2023–24	**$62.2 million**	**~903,000+**	Multiple	Average: ~5.5 weeks	**First ARC crisis season to exceed $60M in payouts; validated the parametric mechanism at scale**

Table A.3: *African Risk Capacity (ARC) sovereign parametric drought insurance payouts for the 2023–24 El Niño event season. Comparison: Zimbabwe alone appealed for $2 billion in international assistance, highlighting the gap between parametric coverage and assessed need. Source: African Risk Capacity Agency (2024 Annual Report; press releases).*

ANNEX B

Annex B: Selected Bibliography

B.1 Peer-Reviewed Literature

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Annex C: Glossary of Technical Terms

AMIS: Agricultural Market Information System. A G20 initiative providing near-real-time global supply and demand data for major agricultural commodities, coordinated by FAO.

Anticipatory action: Humanitarian intervention delivered before a disaster materializes, based on meteorological triggers and early warning signals, as opposed to reactive response after impacts occur.

ARC (African Risk Capacity): The African Union's specialized climate risk pooling mechanism, established in 2012, providing parametric (index-based) sovereign drought insurance to African governments.

Cadre Harmonisé (CH): The regional food security assessment framework covering 15 West African countries, producing harmonized IPC-equivalent classifications through a multi-agency process coordinated by CILSS (Permanent Inter-State Committee for Drought Control in the Sahel).

ENSO (El Niño-Southern Oscillation): The coupled ocean-atmosphere climate variability system centered on the tropical Pacific, which oscillates between El Niño (warm phase) and La Niña (cold phase) on 2–7-year cycles.

FEWS NET: Famine Early Warning Systems Network. USAID-funded network providing monthly food insecurity projections for 35+ countries, using satellite data, market monitoring, and field assessments.

GHACOF: Greater Horn of Africa Climate Outlook Forum. A seasonal climate outlook process for the Greater Horn of Africa, convened four times per year by ICPAC, providing probabilistic precipitation forecasts.

IPC (Integrated Food Security Phase Classification): The internationally accepted standard for classifying food security emergencies on a five-level scale from IPC Phase 1 (Minimal) to IPC Phase 5 (Catastrophe/Famine).

JNIM (Jamaa Nusrat ul-Islam wa al-Muslimin): Al-Qaeda's primary Sahel affiliate, formed in March 2017. Active in Mali, Burkina Faso, and Niger. Controls approximately 40,000 km² of territory as of mid-2026.

Niño 3.4 region: The primary El Niño monitoring zone in the tropical Pacific, defined as the area between 5°N and 5°S latitude and 170°W and 120°W longitude.

Oceanic Niño Index (ONI): NOAA's standard operational measure of El Niño intensity, calculated as the three-month running average of sea surface temperature anomalies in the Niño 3.4 region relative to the 1991–2020 climatological baseline.

Parametric insurance: Insurance where payouts are triggered by a pre-defined index (e.g., satellite rainfall measurement, vegetation index) rather than assessed losses, enabling rapid disbursement within weeks of trigger conditions being met.

Relative Niño index: An ECMWF-developed index introduced in June 2026 that adjusts the standard ONI for background warming trends, enabling more accurate comparisons between current El Niño events and historical analogues measured against a cooler baseline.

SAPP (Southern African Power Pool): The regional electricity trading platform and interconnection system for the SADC region, coordinating cross-border electricity generation and transmission among 12 member states.

Spring Predictability Barrier: The reduction in ENSO forecast skill that occurs when forecasts are made during the boreal spring (March–May), when the coupled ocean-atmosphere system is in a relatively unconstrained state. Forecasts made after June carry substantially higher confidence.

TAO/TRITON: The Tropical Atmosphere Ocean (TAO) and TRITON mooring array, a network of approximately 70 moored buoys in the equatorial Pacific between 8°N and 8°S, providing real-time ocean and atmospheric measurements that are the foundation of El Niño monitoring.

Teleconnection: A statistically material correlation between climate variables at widely separated geographic locations, mediated by large-scale atmospheric circulation patterns. El Niño teleconnections link tropical Pacific SST anomalies to regional rainfall and temperature patterns globally.

Walker Circulation: The overturning east-west atmospheric circulation system in the tropical Pacific, driven by the SST contrast between the warm western Pacific and cooler eastern Pacific. El Niño weakens the Walker Circulation by warming the eastern Pacific, fundamentally altering global atmospheric circulation patterns.