ENSO Transition and Forecast Uncertainty

EngineHouse Analysis

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Overview

The tropical Pacific is transitioning from weak La Niña toward ENSO-neutral conditions, with emerging El Niño probability reaching 40% by May–July 2026. This state shift coincides with the boreal spring predictability barrier, a period of inherently reduced forecast skill that undermines agricultural planning, water resource allocation, and disaster preparedness across vulnerable regions. The combination of genuine climate state uncertainty and methodological forecast limitations creates acute planning failures with direct consequences for food security and water access.

SECTION 2

Main Findings

What the evidence shows

Key Findings

- ENSO state is actively transitioning: La Niña is weakening with 60% probability of ENSO-neutral conditions March–May 2026, rising to 70% April–June, while El Niño probability reaches 40% by May–July. This multi-month uncertainty window means global precipitation and temperature patterns remain in flux precisely when farmers and water managers need seasonal clarity.
- Subsurface heat is moving eastward across the central-eastern Pacific, signalling active ocean dynamics that could accelerate El Niño development. This physical signal indicates the transition is not merely statistical noise but reflects real energy redistribution in the climate system.
- Boreal spring predictability barrier is suppressing forecast confidence during the critical April–June window. This seasonal phenomenon—a known limitation in climate prediction skill—compounds the inherent uncertainty of ENSO state transitions, leaving planners with forecasts of reduced reliability precisely when decisions must be locked in.
- Agricultural and water resource planning systems face conflicting seasonal forecasts. Crop planting, irrigation scheduling, and reservoir management decisions cannot be deferred, yet the underlying climate guidance carries material uncertainty, forcing choices under conditions of genuine ambiguity rather than risk.

SECTION 3

Evidence

Key passages from the source

Key Passages

- WMO forecasts show 60% ENSO-neutral probability March–May 2026, rising to 70% April–June and 60% May–July, with El Niño probability reaching 40% by May–July. This declining confidence in ENSO-neutral persistence and rising El Niño signal indicates the system is genuinely in transition rather than stable, creating a multi-month window of elevated uncertainty.
- Sea surface temperatures and subsurface heat patterns reveal eastward movement across the tropical Pacific. This physical oceanographic signal indicates active energy redistribution that could drive faster El Niño development than historical averages, adding urgency to an already uncertain forecast window.
- The boreal spring predictability barrier is reducing forecast confidence during April–June, a period when agricultural and water resource decisions are typically finalized. This methodological limitation—inherent to seasonal prediction skill—means planners cannot rely on normal forecast accuracy during the critical decision window.

SECTION 4

Consequences

Human and systemic impacts

Human Consequences

Food price volatility emerges as the most immediate affordability threat. Farmers and commodity markets face conflicting seasonal forecasts during the critical planting window; without clarity on whether El Niño or ENSO-neutral conditions will prevail, planting decisions become speculative, driving hedging behaviour and commodity price swings that hit low-income households hardest through elevated food costs. Water resource planning failures compound this risk: communities dependent on seasonal rainfall forecasts for irrigation, drinking water supply, and hydropower generation cannot confidently allocate resources when underlying precipitation predictions carry material uncertainty. This planning failure leaves regions unprepared for both drought and flood scenarios—infrastructure is neither sized nor positioned to handle the full range of plausible outcomes. Disaster preparedness systems cannot adequately mobilize when climate forecasts are unreliable; emergency response agencies require seasonal guidance to pre-position resources, train personnel, and coordinate with vulnerable populations, yet the forecast uncertainty during this critical window undermines these preparations. The consequence is a population-level vulnerability gap: communities face genuine climate volatility with degraded early warning and planning capacity, increasing exposure to both food insecurity and water-related disasters.

SECTION 5

Why This Matters

Broader significance

Significance

This signal reveals a critical vulnerability in climate adaptation infrastructure: planning systems are designed for forecast reliability that does not exist during key seasonal transitions. The boreal spring predictability barrier is not a temporary anomaly but a recurring structural limitation in seasonal prediction skill, yet agricultural, water, and disaster management systems continue to operate as though high-confidence forecasts are available year-round. ENSO transitions during low-skill periods expose this mismatch, forcing decisions under genuine uncertainty and creating cascading failures in food security and water access that disproportionately harm vulnerable populations.

Sources & Provenance

- WMO Global Producing Centres ENSO forecasts (mid-February 2026 outlook)
- Tropical Pacific sea surface temperature and subsurface heat observations
- Boreal spring predictability barrier analysis (seasonal forecast skill limitation)