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El Niño – the Development Challenge for India

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El Niño – the Development Challenge for India

Climate Shock ↔ Economic Risk

ENSO FORECAST 2026
 82% Mo. Jy May-July 2026
 96% Winter 2026-27
 Source: NOAA ENSO Diagnostic Discussion Report (2026)

IMD MONSOON FORECAST
 92% OF LONG PERIOD AVERAGE
 BELOW NORMAL

HOW EL NIÑO IMPACTS INDIA

- HEAT STRESS**
 - Reduced Productivity
 - Health Risks
 - Lower Incomes
 - Informal Sector Hit
- AGRICULTURE DISRUPTION**
 - Weak Monsoon
 - Lower Crop Yields
 - Higher Costs
 - Rural Distress
- INFLATION PRESSURE**
 - Food Prices Rise
 - Burden on Poor
 - Lower Purchasing Power
 - Stagflation Risk
- URBAN VULNERABILITY**
 - Urban Heat Island
 - Water & Health Stress
 - Inequality Widens
 - Vulnerable Hit Most

GOVERNMENT INITIATIVES

- IMD Early Forecast & Warnings
- Heat Action Plans
- PMFBY
- PMKSY Micro-irrigation
- Jal Shakti Abhiyan
- Atal Bhujal Yojana

THE WAY FORWARD

- Build Climate Resilient Cities
- Protect Vulnerable Workers
- Strengthen Agriculture
- Strengthen Social Safety Nets
- Invest in Water & Infrastructure
- From Vulnerability to Resilience

Prepare Today Adapt Tomorrow Build a Resilient India

“El Niño is not just a weather event. It is an economic transmission mechanism.”

THINK CLIMATE THINK DEVELOPMENT THINK INDIA

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1. The discussion surrounding El Niño is often confined to weather forecasts, rainfall predictions, and monsoon performance. However, in a country like India, El Niño is far more than a meteorological phenomenon. It represents a multidimensional development challenge capable of transmitting climate shocks into the broader economy through reduced agricultural productivity, labour market disruptions, inflationary pressures, and heightened social vulnerabilities. As climate change intensifies weather extremes, El Niño increasingly demonstrates how climate risk can rapidly evolve into economic risk, particularly for developing economies with large informal sectors such as India.
2. The **El Niño–Southern Oscillation (ENSO)** is a naturally occurring climate phenomenon characterized by abnormal warming of sea surface temperatures in the central and eastern Pacific Ocean. The U.S. National Oceanic and Atmospheric Administration (NOAA), through its **ENSO Diagnostic Discussion Report (2026)**, has forecast a high probability of El Niño conditions, with an 82% likelihood during May–July 2026 and a 96% probability of continuing through the winter of 2026–27. Simultaneously, the India Meteorological Department (IMD) has projected monsoon rainfall at only 92% of the Long Period Average, placing it in the “below normal” category.

3. Such forecasts carry profound implications for India because the country's economy remains significantly dependent on monsoon performance. Climate disturbances do not remain confined to the atmosphere; they quickly spread through labour markets, agricultural systems, food supply chains, and household economies. Therefore, El Niño should be viewed not merely as a weather event but as an economic transmission mechanism capable of amplifying existing developmental challenges.
4. The first major channel through which El Niño affects the economy is **heat stress**. Rising temperatures and prolonged heatwaves reduce the productivity of workers who depend on outdoor labour. Construction workers, agricultural labourers, delivery personnel, street vendors, and other informal sector workers are particularly vulnerable because their livelihoods require prolonged exposure to harsh climatic conditions.
5. Unlike employees in climate-controlled offices, these workers possess limited protection against extreme heat. Consequently, higher temperatures lead to reduced working hours, lower productivity, increased health risks, and declining incomes. Since millions of Indians rely on daily wages for survival, heat stress directly translates into economic insecurity and social vulnerability.
6. The second and perhaps most significant channel is **agriculture**, which remains the backbone of rural India. Nearly 70% of India's annual rainfall is supplied by the southwest monsoon, making agricultural production heavily dependent on monsoon performance. During El Niño years, weakened rainfall creates uncertainty in sowing decisions, increases dependence on irrigation, and accelerates groundwater extraction. Farmers face higher production costs while simultaneously confronting lower crop yields.
7. Small and marginal farmers, who constitute nearly 86% of India's farming community, are particularly susceptible to such climatic shocks. Many already struggle with rising input costs, fluctuating market prices, and limited access to institutional credit. El Niño compounds these challenges by reducing agricultural output and weakening rural incomes. The resulting distress often triggers indebtedness, migration, and greater economic instability in rural areas. Thus, El Niño acts as a direct shock to the production base of India's rural economy.
8. A third critical channel is **inflation**, particularly food inflation. Climate-induced agricultural disruptions often result in reduced supply of essential commodities such as vegetables, pulses, cereals, and fruits. As supply contracts and demand remains relatively stable, prices rise. According to recent estimates, food inflation has already shown signs of upward movement, raising concerns that a weaker monsoon could intensify inflationary pressures further.
9. Food inflation affects every household but disproportionately burdens poorer sections of society, which spend a larger share of their income on food. Higher food prices reduce purchasing power, worsen nutritional outcomes, and increase household vulnerability. For policymakers, this creates a difficult balancing act. The same climatic shock that weakens economic growth also contributes to rising

inflation, producing a situation similar to "stagflation," where economic slowdown coexists with price increases.

10. The impact of El Niño extends beyond rural regions into urban India as well. Rapid urbanization, extensive concretization, and shrinking green spaces have transformed many Indian cities into **urban heat islands**. During periods of extreme heat, temperatures in cities often remain significantly higher than surrounding rural areas. While affluent households can adapt through air-conditioning, better housing, and improved infrastructure, poorer communities frequently reside in overcrowded settlements with inadequate access to cooling, water, and healthcare facilities.
11. As a result, climate change and El Niño contribute to widening urban inequalities. Vulnerable populations face greater exposure to heat stress, water shortages, and health risks, reinforcing existing socio-economic disparities. Thus, climate change increasingly functions as a force multiplier of inequality, affecting those least responsible for environmental degradation most severely.
12. Recognizing these challenges, the Government of India has initiated several adaptation measures. The India Meteorological Department provides improved seasonal forecasting and early warning systems. The National Disaster Management Authority promotes Heat Action Plans to reduce heat-related mortality and morbidity.
13. Agricultural resilience is being strengthened through initiatives such as the Pradhan Mantri Fasal Bima Yojana (PMFBY), promotion of drought-resistant crop varieties, and expansion of micro-irrigation under the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY). Water conservation efforts, including the Jal Shakti Abhiyan and Atal Bhujal Yojana, seek to improve groundwater management and enhance water security.
14. However, the scale of the challenge requires a more comprehensive approach. Building climate-resilient cities, protecting vulnerable workers, improving agricultural sustainability, strengthening social safety nets, and investing in water-efficient infrastructure must become national priorities. Climate adaptation can no longer be viewed as an environmental concern alone; it is an economic necessity.
15. In conclusion, El Niño demonstrates how climatic disturbances can trigger far-reaching economic consequences in India. Through heat stress, agricultural disruptions, and inflationary pressures, climate shocks increasingly influence livelihoods, productivity, and development outcomes. As climate change intensifies, India must transition from reactive disaster management to proactive climate resilience.
16. The future challenge is not merely to forecast El Niño but to ensure that society, the economy, and governance systems are prepared to withstand its impacts. Only then can India transform climate vulnerability into climate resilience and secure sustainable development in an era of growing environmental uncertainty.

Main Practice Question

GS–III (Environment, Economy & Disaster Management)

The NOAA ENSO Diagnostic Discussion Report warns of an impending El Niño. Examine how ENSO-induced climatic disturbances can trigger an economic crisis in India. Discuss the impacts and evaluate governmental adaptation measures. (15 Marks, 250 Words)

1. Introduction

1. Define **ENSO (El Niño–Southern Oscillation)** as a periodic ocean–atmosphere phenomenon in the Pacific Ocean.
2. Mention NOAA's 2026 forecast indicating a high probability of El Niño and IMD's projection of a below-normal monsoon.

2. ENSO Diagnostic Discussion Report – Significance

1. NOAA's ENSO Diagnostic Discussion Report provides scientific forecasts on El Niño/La Niña conditions.
2. Forecasts:
 1. 82% probability during May–July 2026.
 2. 96% probability through Winter 2026–27.
3. Acts as an early warning system for governments, farmers, and disaster management agencies.

3. How ENSO Can Lead to an Economic Crisis in India

A. Heat Stress Channel

1. Extreme temperatures reduce labour productivity.
2. Impacts construction workers, agricultural labourers, street vendors, delivery personnel.
3. Reduced working hours and lower daily incomes.

B. Agricultural Channel

1. Weak monsoon affects nearly 70% of rainfall-dependent agriculture.
2. Delayed sowing and reduced crop yields.
3. Increased irrigation costs and groundwater depletion.
4. Greater vulnerability of small and marginal farmers.

C. Inflation Channel

1. Crop losses lead to food shortages.
2. Rising prices of vegetables, pulses, cereals, and edible oils.
3. Food inflation erodes household purchasing power.
4. Monetary policy challenges due to simultaneous inflation and slowing growth.

4. Impact on India

Economic

1. Lower agricultural output.
2. Rural distress and reduced consumption.
3. Pressure on GDP growth.

Social

1. Increased poverty and food insecurity.
2. Greater burden on informal workers.
3. Migration from rural to urban areas.

Environmental

1. Water scarcity.
2. Groundwater over-extraction.
3. Increased frequency of heatwaves and droughts.

Urban

1. Urban heat island effect.
2. Greater inequality in access to cooling and water.

5. Government of India Measures

Institutional & Forecasting

1. IMD's Long Range Monsoon Forecasts.
2. National Disaster Management Authority (NDMA) heat action guidelines.

Agriculture

1. Pradhan Mantri Fasal Bima Yojana (PMFBY).
2. Drought-resilient crop varieties.
3. Promotion of micro-irrigation under PMKSY.

Water Management

1. Jal Shakti Abhiyan.
2. Atal Bhujal Yojana.
3. Rainwater harvesting initiatives.

Heat Adaptation

1. City-level Heat Action Plans.
2. Early warning systems.
3. Worker welfare advisories.

Climate Action

1. National Action Plan on Climate Change (NAPCC).
2. Mission LiFE and climate-resilient infrastructure initiatives.

6. Conclusion (20–30 words)

1. Climate shocks increasingly translate into economic shocks.
2. India must shift from reactive disaster response to proactive climate resilience through sustainable agriculture, heat-resilient cities, and integrated water governance.