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Falling behind

Urbanisation in Mumbai is evolving faster than its infrastructure upgrades

The southwest monsoon has been highly active over western India, with south-westerly winds loaded with moisture sweeping over the Western Ghats and delivering intense rains along the Konkan coast, while other weather systems offshore are routing more moisture over Mumbai and the surrounding areas. In urban areas in general, rainfall intensity matters more than volume. Mumbai itself can generally absorb moderate rainfall over several hours; however, its drainage – like in many Indian cities – cannot handle several hundred millimetres in short bursts. Heavy rainfall also overwhelmed river catchments in parts of Maharashtra, including around Nashik, while high tides reduced the efficiency of Mumbai's stormwater drainage, worsening flooding in the city. Mumbai-Pune rail services were suspended after landslides in the Bhor Ghat and flights were affected. The closures of the Mumbai-Pune expressway and the Mumbai-Goa highway and significant flooding on the Mumbai-Ahmedabad expressway were disruptive, speaking to the increasing erraticity of monsoon rainfall, the vulnerabilities associated with linear infrastructure projects, and the ease with which the effects of natural disasters are compounded by cascading failures. A chawl collapse in Mankhurd took the lives of five children.

Mumbai lies on a peninsula built mostly on reclaimed land, former marshes, tidal flats, and low-lying coastal areas, creating the characteristic risk of higher flooding when rainfall coincides with high tide. It is compounded by decades of haphazard urbanisation that has encouraged water to run-off rather than be absorbed by the ground, forcing drains to handle more water than their design limits. After the July 2005 floods, when it received 944 mm in 24 hours, Mumbai launched the BRIMSTOWAD project and widened drains, installed pumping stations, and undertook premonsoon de-silting. Many of these works remain incomplete while some completed upgrades are based on assumptions about the monsoon that climate change has since undermined. Officials have also argued that pre-monsoon desilting helped reduce flooding in parts of Mumbai, but water on the Mumbai-Ahmedabad expressway, the chawl collapse, deadly tree falls in Kurla and Aarey, lack of redundancies in public transport, and the BMC's belated advisory to builders to halt hazardous construction all suggest a governance lapse. Mumbai's accountability also remains split across the BMC for local drainage and roads, the IMD for forecasting, the NDRF, two Railway zones, the State government, and highway authorities. Overall, the city has improved at shutting down to save lives and minimising the death toll – but as climate change and urbanisation evolve faster than infrastructure upgrades, simply waiting for system capacity to catch up to demand will be a failing strategy.

URBAN FLOODING IN INDIA: BUILDING CLIMATE-RESILIENT CITIES

GS 1 – Urbanisation
GS 3 – Disaster Management, Climate Change, Infrastructure

I. CONTEXT

Recurring urban floods in cities such as **Mumbai, Bengaluru, Chennai, Delhi, Hyderabad, Gurugram and Guwahati** underscore the growing challenge of unplanned urbanisation, ecological degradation and climate-induced extreme rainfall, making urban resilience a governance priority.

II. WHY ARE INDIAN CITIES VULNERABLE?

Rapid & Unplanned Urbanisation
- Built-up areas replacing wetlands, lakes and floodplains.
- Encroachment of natural drainage channels.

Climate Change
- Increase in short-duration, high-intensity rainfall.
- More frequent extreme rainfall and cloudburst events.

Weak Urban Infrastructure
- Outdated storm-water drains.
- Drain blockage due to solid waste.
- Low drainage carrying capacity.

Ecological Degradation
- Shrinking wetlands, mangroves, lakes and urban forests.
- Reduced groundwater recharge and higher surface runoff.

Governance Deficit
- Weak land-use planning.
- Multiple agencies with poor coordination.
- Poor enforcement of Master Plans.

III. MULTI-DIMENSIONAL IMPACTS

Economic
- Damage to infrastructure, transport and businesses.
- High reconstruction and productivity losses.

Social
- Loss of lives and property.
- Highest burden on informal settlements and urban poor.

Environmental
- Sewage overflow and water pollution.
- Loss of biodiversity and urban ecosystems.

Health
- Rise in vector-borne and water-borne diseases (dengue, malaria, leptospirosis, diarrhoea, etc.).

Governance
- Frequent disruption of transport, electricity and drinking water.
- Higher disaster response expenditure.

IV. KEY DATA & FACTS

~600 MILLION
Indians are projected to live in urban areas by 2036.
(Economic Survey 2023–24)

~75% OF GDP
Urban India is expected to contribute ~75% of GDP by 2036.
(Economic Survey 2023–24)

5,161 ULBs
Urban Local Bodies have been identified as urban flood-prone.
(NDMA)

US$5 BILLION
Urban floods could cause annual losses of nearly US$5 billion by 2030 if resilience is not built.
(World Bank/WRI 2025)

SDG 11
Sustainable Cities and Communities aims to make cities inclusive, safe, resilient and sustainable.
(UN SDGs)

V. MAJOR URBAN FLOOD HOTSPOTS & CAUSES

Mumbai	Bengaluru	Chennai	Delhi	Hyderabad	Guwahati
Coastal flooding, mangrove loss, high-intensity rainfall.	Encroachment of interconnected lakes.	Wetland destruction and inadequate drainage.	Yamuna floodplain encroachment and urban runoff.	Urban expansion over lakes and nalas.	Wetland loss, hill runoff and drainage bottlenecks.

VI. WAY FORWARD: TOWARDS CLIMATE-RESILIENT CITIES

- Adopt Integrated Urban Flood Management (IUFM) with basin-level approach.
- Restore and protect wetlands, lakes, floodplains, mangroves and urban forests.
- Upgrade storm-water drainage based on future climate projections.
- Enforce scientific land-use planning and strict zoning regulations. No construction in low-lying areas.
- Implement Nature-based Solutions (NbS): permeable pavements, rain gardens, green roofs, urban forests.
- Strengthen early warning systems using IMD forecasts, C-FLOOD and GIS-based flood mapping.
- Improve solid waste management and regular desilting of drains.
- Build climate-resilient cities under **AMRUT 2.0, Smart Cities Mission** and **National Disaster Management Plan.**

VII. CONSTITUTIONAL & INSTITUTIONAL LINKAGES

Constitutional Provisions
- **Article 21** – Right to life (includes clean and safe environment).
- **74th Constitutional Amendment Act** – Urban Local Governance.
- **12th Schedule** – Urban planning, drainage, public health, sanitation.

Key Institutions
- **NDMA** – Urban Flood Management Guidelines (2010).
- **IMD** – Impact-based weather forecasting.
- **CWC** – Flood forecasting and advisories.
- **NIUA** – Urban resilience and capacity building.

> "Urban flooding is no longer merely a rainfall problem—it is a challenge of urban governance, ecological conservation and climate adaptation. India must move from reactive flood relief to resilient, risk-informed and nature-positive urban planning."

Important International Frameworks
- Sendai Framework for Disaster Risk Reduction (2015–30)
- Paris Agreement
- SDG 11 – Sustainable Cities & Communities

Related Schemes AMRUT 2.0, Smart Cities Mission, PMAY (Urban), Swachh Bharat Mission (Urban)

Sources: NDMA, IMD, Economic Survey 2023–24, World Bank/WRI Report 2025, PIB, MoHUA, CWC

AI governance and a voice for the Global South

Jhalak M. Kakkar

Executive Director, Centre for Communication Governance, National Law University Delhi

Astha Kapoor

Co-founder and Director of the Aapti Institute

In February 2026, India hosted the India AI Impact Summit 2026, that sought to put the needs and challenges of the Global South at the centre of the Artificial Intelligence (AI) discourse. The summit's themes framed by India were rooted in the contextual realities of the Global South with a focus on real-world harms. This was a departure from the previous summits (at Bletchley Park, 2023, U.K.; Seoul 2024, and Paris 2025) that prioritised both catastrophic and existential risks over questions of present harms, equity and inclusion.

As the Summit evolved, the political and policy momentum shifted toward raising capital for AI development in India and accelerating adoption through domestic use cases. In this process, India increasingly began to position itself within the newly framed "middle power" discourse, at the cost of Global South solidarity which underpinned the Summit's original vision. India clarified this stance by joining Pax Silica, signalling strategic alignment with the United States-dominated semiconductor supply chain. As part of the agreement, India agreed to adopt a pro-innovation regulatory approach, thereby compromising its pursuit of strategic autonomy.

Middle power dilemma

This repositioning of India's geopolitical character, as a middle power, has left it in a lonely corner. The middle power narrative is diplomatically attractive but strategically uneasy. India's aspirations to be positioned alongside European and Asian countries such as Japan, which do not consider India a peer in technological capability or economic development, is also in dissonance with its colonial past and low per capita – realities that firmly anchor India within the Global South.

Accompanying the friction between India's ambition and its realities is the U.S.'s foreign policy push for global AI adoption of U.S. tech, bringing into question whether it will be a reliable partner in the AI adventure to India. The U.S. has declared its disinterest in AI governance, especially global multilateral or multistakeholder governance. This raises fundamental questions for India and the Global South on concentration of infrastructure, and economic power in the U.S. Will this be a repeat of the social media story – when U.S. foreign policy pushed back against regulating for user harms to safeguard the interests of social media platforms concentrated in the U.S.? Furthermore, economic value primarily accrues to American industry despite significant business and users outside its borders, while disproportionate externalities and harms also persist in domestic markets.

India faces a choice between dependency and leadership in AI governance

Pertinent issues

In the AI story, numerous questions arise. Will India mainly be a consumer of U.S. tech with Indian users bearing disproportionate harm? Will India be a site for extraction of data, labour for data labelling, minerals for manufacturing, and land, water, electricity and resources for data centres, primarily enabling the growth of American Big Tech?

Since the summit in February, India has sanctioned land for data centres displacing communities, triggering protests. There are no meaningful guardrails to protect local communities as American companies scrape public content to build language and indigenous knowledge datasets. The non-profit ecosystem is signing memoranda of understanding to diffuse AI and adopt use cases. However, fundamental AI innovation has been slow – India remains unable to compete with global foundational models, its semiconductor development is focused on low-value assembly and there is a question of adequate capital to invest and grow the national AI ecosystem.

But perhaps all is not lost for India. The first of a two-part UN Global Dialogue on AI is underway in Geneva (July 6-7, 2026). Stakeholders will convene to discuss how the multilateral and multistakeholder ecosystem can come together to collectively define the rules for the governance of AI.

A window for leadership

India can use the opportunity to stitch together a fractured AI policy agenda that currently lacks a leader. It remains one of the few countries with the political heft, the technical capacity, and a diverse market to play this role. Rather than positioning itself merely as a destination for investment or a market for AI, India could reassert a vision of technological development rooted in public purpose, user safety, strategic autonomy, and international cooperation.

India should reiterate the need for international norms that empower Global South countries to focus on building local AI ecosystems and fostering innovation, safeguarding users, enhancing regulatory capacity, enabling skilling and developing domestic infrastructure. It should also advance critical debates on competition and consumer protection and ensure economic value accrues within national markets.

Concurrently, India must create pathways for international cooperation on AI within the Global South. The Geneva dialogue is a critical moment for Global South countries to come together to enable enhanced agency and strategic autonomy.

This requires developing innovative approaches to pool capacity and resources including cooperation on data, compute, interoperable standards and shared protocols and governance, and strengthening institutional capacity both regulatory and technical across the Global South.

As heterogeneous as the Global South is, it can be a counterweight to the hegemony of Big Tech. India can lead this march to ensure that shared governance norms are created and benefits are shared with the people in the Global South, appropriately protecting them from harm.

7 JULY 2026

AI GOVERNANCE AND A VOICE FOR THE GLOBAL SOUTH

India's opportunity to lead inclusive, ethical and development-oriented AI governance

CONTEXT

In February 2026, India hosted the **India AI Impact Summit 2026** in New Delhi. The Summit sought to put the needs and priorities of the Global South at the centre of AI discourse. It called for an inclusive, trusted, safe and human-centric AI that addresses real-world harms, development gaps and the interests of billions.

India AI Impact Summit 2026 – At a Glance

- Feb 11–12, 2026 Bharat Mandapam, New Delhi
- 100+ countries, global leaders, tech companies, startups, experts
- Placing the Global South at the centre of AI conversation
- Outcome: "Delhi Declaration on Responsible AI" & "Call for Action"

I. WHY AI GOVERNANCE MATTERS

- **Transformative potential:** AI is a general-purpose technology that can drive economic growth, improve public services and solve complex social challenges.
- **Global power asymmetry:** A few countries and Big Tech firms control AI models, infrastructure, data and standards.
- **Risks and harms:** Bias, surveillance, privacy violations, job displacement, misinformation, deepfakes and algorithmic discrimination.
- **Global South concerns:** Under-representation in AI rule-making despite majority of the world's population.
- **Development divide:** AI can widen or bridge gaps depending on access, capacity, data rights and governance.

II. INDIA'S APPROACH

- **Inclusive & Human-Centric AI:** AI for inclusive growth, sustainable development and human well-being. Focus areas: health, agriculture, education, climate resilience.
- **Strategic Autonomy:** India does not want to align exclusively with any one country or ecosystem; seeks collaboration without dependency.
- **Digital Public Infrastructure (DPI):** Leverage India's DPI stack (Aadhaar, UPI, ONDC) to build inclusive, interoperable and people-centric AI models.
- **Data Sovereignty & Equitable Access:** Advocate fair data governance, open access to datasets & compute resources; respect local contexts and languages.
- **Capacity Building:** Support AI literacy, talent development, research and startup ecosystems across Global South countries.

III. CHALLENGES FOR INDIA & GLOBAL SOUTH

- **Data & Privacy:** Who owns data? Need for data protection, sovereignty and cross-border data flow rules that respect national interests.
- **Compute Divide:** High cost and limited access to compute infrastructure; market dominance of Big Tech firms in chips and clouds.
- **Jobs & Livelihoods:** AI-driven automation may displace jobs. Need re-skilling, social protection and human-in-the-loop systems.
- **Misinformation & Deepfakes:** Threats to democracy, social harmony and public trust; need global norms on content authenticity.
- **Environmental Impact:** High energy consumption of data centres and large models; need green AI.
- **Concentration of Power:** Control over models, standards and platforms by a few players.

IV. GLOBAL SOUTH PERSPECTIVE

- **A common voice:** Global South must collectively define AI governance in global fora (UN, G20, BRICS, WTO).
- **Access & Equity:** Affordable access to technology, compute and quality data is essential for inclusive growth.
- **Financing & Resources:** Need concessional finance, technology transfer and support for capacity building and innovation.
- **Standards & Norms:** Shape global norms on AI safety, ethics, accountability and human rights reflecting diverse contexts.
- **South–South Cooperation:** Strengthen cooperation on data, compute, talent, skills and innovation ecosystems.

V. WAY FORWARD

- **Build a Strong Domestic Ecosystem:** Invest in compute infrastructure, semiconductor manufacturing, cloud, data centres and AI R&D.
- **Robust Data Governance:** Enact strong data protection law, prompte data localisation for critical sectors and enable ethical data sharing.
- **Promote Open & Interoperable AI:** Support open-source models, datasets, benchmarks and transparent governance.
- **Capacity Building at Scale:** Offer training, skilling, research grants and technology partnerships to developing nations.
- **Lead Global AI Dialogue:** Actively engage in UN Global Dialogue on AI, G20, GPAI, UNESCO and other international fora.
- **AI for Humanity:** Ensure AI serves humanity, not just markets, and no nation is left behind in the AI revolution.

VI. CONCLUSION

AI governance is not just a technical issue—it is a geopolitical, ethical and developmental choice. India, with its democratic values, Digital Public Infrastructure and commitment to inclusion, has the opportunity to lead the Global South towards a trusted, responsible and people-centric AI future.

> **AI FOR ALL,**
> **AI FOR GOOD,**
> **AI FOR GLOBAL SOUTH.**

Questions surrounding the Quad's future

With the U.S. reversing the U.S. Indo-Pacific Command back to the U.S. Pacific Command, criticisms have been levelled against the relevance of the Quad

DATA POINT

Amit Kumar

Last week, Japanese Prime Minister Sanae Takaichi was in New Delhi for the 16th India-Japan Annual Summit, her first visit to India since assuming office. The two sides reaffirmed their commitment to a free and open Indo-Pacific. The reaffirmation, however, comes at a moment when the idea of the Indo-Pacific appears to be losing its principal champion. On June 16, the Pentagon renamed the U.S. Indo-Pacific Command back to the U.S. Pacific Command, reversing a change it had made in 2018.

The renaming of the Command in 2018, although symbolic, recognised the region's growing significance and acknowledged India's centrality to the U.S.'s regional strategy. The reversal suggests that the region no longer enjoys the priority it once did in Washington. In fact, the National Security Strategy released by the U.S. in November 2025 prioritises the Western Hemisphere over the Indo-Pacific and mentions the Quad only in passing. It also assuages Beijing, which has long resented the formulation. Washington's approach to managing its relations with Beijing is undergoing a change under the current administration.

All of this has put the future of the Quad under the scanner. If Washington retreats from the idea, the platform built around it inevitably invites questions about its relevance. These anxieties only add to a set of older concerns. How relevant or securitised is the Quad? Is it doing enough? And the criticisms aren't without substance.

The first criticism entails the hesitation to name China. If the objective is indeed to shape the balance of power in the region, the silence over Beijing's military and economic aggression is bad optics. However, this is largely a normative criticism. One can argue that the Quad's reluctance to name Beijing is strategic, because positioning itself as an anti-China platform could dissuade smaller countries from associating with it.

Critics highlight the Quad's hesitation to project itself as a security-centric grouping as another of its shortcomings. Given that Beijing poses hard security challenges to the region, any balancing effort has to be primarily security-centric. The extent of the grouping's hesitation is evident in the members' active effort to make an implicit distinction between Quad and the Quadrilateral Security Dialogue (QSD). There is a reluctance to use them interchangeably, even as the members acknowledge the grouping's origins to be rooted in the first QSD in 2004.

The Quad's reluctance to elevate the partnership to a 2+2 format – a bilateral ministerial dialogue comprising Foreign and Defence Ministers – is another pain point. Even as each of the four countries has formalised 2+2 meetings bilaterally with one another, the Quad continues to host meetings only at the leaders' and Foreign Ministers' level.

Domain of cooperation

The alleged overwhelming focus on non-security or soft issues is a related criticism. However, a review of the Quad's agenda tells a different story. Even though the Quad assumed its current form in 2017, there was a lull for the first four years. It only picked up steam in 2021 during the COVID-19 pandemic, when the four countries held their first virtual leaders' summit and announced a first set of initiatives. Within six months, the Quad held its first in-person leaders' summit and expanded its areas of cooperation. The list today has grown to 37, of which 23 fall under security-related domains **(Chart 1)**. Technology sovereignty, maritime capabilities and secure communications will be key in countering China in the years ahead.

Choosing the right areas of cooperation doesn't necessarily reveal much, though. The type of cooperation and capital flows are key determinants in evaluating the seriousness of the grouping. But a review of the 'type' of cooperation in security-related domains suggests that Quad has a heavy focus on interoperability, data sharing, monitoring, and relief **(Chart 2)**. While this is necessary and critically important for any security-focused grouping, Quad's integration efforts are limited to civilian or non-military grade applications. Nonetheless, these integration exercises have dual-use capabilities and can be leveraged for even military-grade purposes.

The Quad's focus on building capacity and resilient supply chains is also significant, especially as these relate to critical and emerging technologies, maritime, and communications – the domains where the bulk of contestation with China is expected.

The Quad's security focus is not matched by its funding pattern. Based on what is available in the public domain, health and climate have been the primary beneficiaries **(Chart 3)**. One can argue that since most security-related initiatives focus on integration and standard-setting, they do not require the same scale of dedicated funding. But building resilient supply chains would require substantial capital commitment, and that is where the gap is most visible.

The Quad's recent commitment to mobilise $20 billion towards the Critical Minerals Initiative and Framework could change this picture. But it remains only a stated target at this point, with no funding committed or allocated. If security issues make up close to two-thirds of Quad's initiatives, the funding allocation must follow suit.

The questions surrounding the Quad's future will not be settled by nomenclature in Washington. They will be settled by whether the grouping backs its security-heavy agenda with capital.

Uncertain course

Amit Kumar is a Staff Research Analyst with the Geostrategy Programme at The Takshashila Institution. The data for the charts were sourced by the author from his Quad Monitor dashboard

Looking forward: External Affairs Minister S. Jaishankar with U.S. Secretary of State Marco Rubio, Australian Foreign Minister Penny Wong and Japanese Foreign Minister Toshimitsu Motegi during the Quad Foreign Ministers' Meeting, in New Delhi on May 26. ANI

CHART 1: This shows the number of initiatives under different domains of cooperation. Some initiatives span multiple domains, and thus may get counted more than once

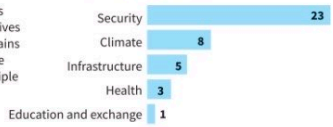


CHART 2: This shows the type of initiatives in security-related domains. Some initiatives can have multiple cooperation 'types'

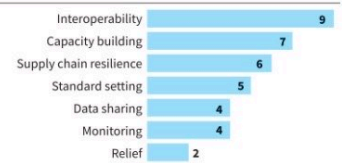


CHART 3: This shows the funding for initiatives under different domains of cooperation. Health receives the highest funding, followed by climate at a distance second

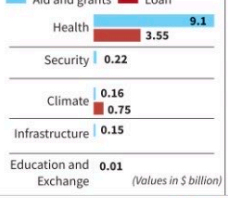
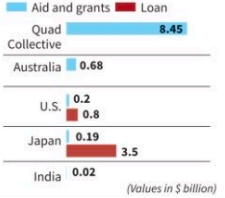


CHART 4: This shows the funding for various initiatives of the Quad by different countries and the Quad Collective. Absence of values indicate no funding



CURRENTLY: 7 JULY 2026 | MAINS ONE-PAGER

QUAD: INDIA'S VISION FOR A FREE, OPEN & INCLUSIVE INDO-PACIFIC

Strengthening Security, Promoting Prosperity, Ensuring Stability

GS PAPER II
International Relations
- ✓ Bilateral Relations
- ✓ Regional & Global Groupings
- ✓ India's Interests

I. CONTEXT

Recent developments have renewed discussions on the Quad's future role in ensuring a rules-based, secure and prosperous Indo-Pacific through cooperation in security, economy, technology and regional public goods.

II. WHAT IS QUAD?

- **Quadrilateral Security Dialogue**
- **Members:** India, Australia, Japan, United States
- **Nature:** Informal strategic partnership
- Consensus-based, non-military alliance
- **Vision:** Free, Open, Inclusive, Rules-Based, Secure and Prosperous Indo-Pacific with ASEAN Centrality

INDIA · AUSTRALIA · JAPAN · UNITED STATES

III. EVOLUTION

- **2004** Cooperation after Indian Ocean Tsunami
- **2007** Formation of QUAD
- **2008** Became inactive
- **2017** Revived on the sidelines of ASEAN Summit
- **2021 onwards** Regular Leaders' Summits, Ministerial meetings and working groups

> "The Quad is not about any country. It is about working together for a better region."
> – *Quad Leaders' Joint Statement, 2021*

IV. SIGNIFICANCE OF QUAD FOR INDIA

A FREE, OPEN, INCLUSIVE & RULES-BASED INDO-PACIFIC

STRATEGIC
- Favourable balance of power in Indo-Pacific
- Uphold freedom of navigation (UNCLOS)
- Enhance maritime security & stability
- Counter coercive & unilateral actions

ECONOMIC
- Resilient supply chains
- Critical minerals & semiconductor partnerships
- Secure infrastructure & digital connectivity
- Promote trade & investment

TECHNOLOGICAL
- AI, Quantum, 5G/6G
- Critical & Emerging Technologies
- Cyber Security
- Space Cooperation
- Digital Public Infrastructure

HUMANITARIAN
- HADR & Disaster Relief
- Maritime Domain Awareness (IPMDA)
- Vaccine & Health Security
- Climate Resilience
- People-to-People Connect

V. MAJOR AREAS OF COOPERATION

- Maritime Security
- Critical & Emerging Technologies
- Critical Minerals
- Supply Chain Resilience
- Clean Energy
- Climate Action
- Cyber Security
- Digital Connectivity
- Undersea Cable Security
- Disaster Response
- Space Cooperation
- Health Security

VI. KEY CHALLENGES

- Different strategic priorities and threat perceptions
- Absence of a permanent institutional structure
- Economic dependence of members on China
- Geopolitical uncertainties and shifting global priorities
- Risk of being perceived as an "Asian NATO"
- Gap between commitments and implementation

The real test for the Quad is delivery, not declarations.

VII. UPSC VALUE ADDITION

IMPORTANT INITIATIVES
- Indo-Pacific Partnership for Maritime Domain Awareness (IPMDA)
- Quad Vaccine Partnership
- Quad Critical & Emerging Technology Working Group
- Quad Climate Working Group
- Quad Cybersecurity Partnership
- Quad Fellowship Programme
- Quad Investors Network

RELATED CONCEPTS
- SAGAR (Security and Growth for All in the Region)
- Indo-Pacific Oceans Initiative (IPOI)
- UNCLOS, 1982
- ASEAN Centrality
- Blue Economy
- Rules-Based International Order

VIII. WAY FORWARD

- Institutionalise cooperation through stronger implementation mechanisms
- Deepen collaboration in critical technologies & digital transformation
- Build resilient supply chains and strengthen critical mineral partnerships
- Enhance maritime domain awareness and capacity building in the region
- Expand cooperation on climate, health, disaster response and clean energy
- Promote inclusive regional architecture with ASEAN at the centre
- Deliver tangible outcomes and regional public goods for long-term relevance

IX. CRITICISM

- Lacks treaty obligations and binding commitments
- Consensus-based approach slows decision-making
- Perceived by China as a containment strategy
- Limited institutional capacity and funding
- Risk of over-securitisation and militarisation

★ PRELIMS FACTS

Members	Established	Nature	India's Vision	Not a Military Alliance
India, Australia, Japan, United States	2007 Revived 2017	Informal Strategic Partnership	SAGAR & Indo-Pacific Oceans Initiative (IPOI)	

Mains Takeaway: The Quad reflects India's multi-aligned foreign policy. Its strength lies in practical cooperation on security, economy, technology and humanitarian challenges to advance a free, open, inclusive, rules-based and prosperous Indo-Pacific.

Will El Niño weaken India's economy?

How could a weak monsoon affect farm output, inflation and economic growth? Why does El Niño remain a major risk for India's economy? How have past El Niño years affected agriculture and inflation? Is India's irrigation and water storage system prepared for another weak monsoon?

ECONOMIC NOTES

V. Nivedita

The story so far:

After the first month of this year's monsoon ended in a massive 40% deficit, the India Meteorological Department (IMD) has forecast that rainfall in July will also be "below normal" or less than 94% of what is usual for the month. "Below-normal rainfall can pose significant challenges for agriculture, water resources, hydropower generation, ecosystem sustainability, and drinking water availability," the agency warned. The outlook for July comes on the back of weak rainfall in June. This comes weeks after Union Agriculture Minister Shivraj Singh Chouhan sounded the alarm, warning about the impact of a potential 'super' El Niño.

How could a poor monsoon damage India's economy?

A poor monsoon can damage the economy in three ways: it affects agricultural output, reducing the sector's contribution to the economy; it hits rural income, denting aggregate demand; and it threatens to push up food prices, causing inflation.

India came into this kharif season from a position of strength – foodgrain output in 2024-25 jumped to 357.73 million metric tonnes, up 25.43 MMT from the previous year. A weak monsoon now puts that momentum at risk.

In a report, CRISIL notes that while paddy acreage is expected to expand in Punjab, Haryana and Bihar, maize acreage is expected to decline as farmers shift towards more remunerative crops. Farmers might also prefer pulses because of lower cultivation costs and water requirements, and may choose not to plant vegetables at all. Irrigation, MSP, procurement support and market conditions also factor in the decision-making process.

This could trigger food and beverage inflation. In its June bulletin, the Reserve Bank of India warned: "An adverse south-west monsoon, if materialised, may weigh on the domestic growth-inflation outlook."

Several of India's worst droughts fell in El Niño years — 1972, 1982, 2009, and 2015. FILE PHOTO

The report noted that daily price data up to June 18 showed food inflation continued to rise and the prices of edible oils, potatoes, onions and tomatoes edged up. A weak monsoon will only push them higher.

Agriculture accounts for only one-fifth of India's Gross Value Added (GVA) but employs 46% of the workforce and supports nearly 55% of the population. "It will have a direct impact on the lives of people," said Prof. R. Ramakumar, School of Development Studies, Tata Institute of Social Sciences.

Prof. Bharat Ramaswami, Department of Economics, Ashoka University, believes farm incomes could fall by up to 10%. "The rural non-farm sector consists mostly of non-traded services such as construction. These sectors contract when agriculture is adversely affected. Industries that depend on rural demand will be affected," he said.

This stress moves into the wider economy. Automobile sales are a reliable early signal; two-wheelers and tractors are among the first sectors to feel the squeeze, followed by real estate in smaller towns and cities. Kotak Mutual Fund, in a blog, has noted that a combined El Niño-plus-drought scenario may shave 20-65 basis points off GDP growth.

Compounding the pressure are pests and fertilizer supply constraints caused by the Iran war.

The Union Cabinet approved a ₹41,533 crore Nutrient-Based Subsidy for Phosphatic and Potassic fertilisers for the kharif season, covering 28 grades. If output still falls short, the government will have to release buffer stocks and import commodities, widening the Current Account Deficit and putting pressure on the rupee.

India's agri-exports face a threat too. "Agriculture exports have clocked a CAGR of 8.2% between fiscals 2020 and 2025, contributing 12% to India's core exports," said Dipti Deshpande, Principal Economist, CRISIL.

How did El Niño impact the economy?

Several of India's worst droughts fell in El Niño years – 1972, 1982, 2009, and 2015. "In the 11 instances of below-normal or deficient monsoon performance at an all-India level since 2000, six were classified as El Niño years by the IMD. Of these, five saw deficient rainfall," Ms. Deshpande said.

The 2009 and 2015 failures illustrate the different impact poor monsoons can have on the economy. "Two subsequent years of rainfall stress and all-India average irrigation cover less than 45%, caused agriculture output to suffer – crop GVA contracted 2.5% and 3.2% in fiscals 2009 and 2010, respectively. Inflation was in double digits," she said.

El Niño conditions moved from weak to strong in 2014 and 2015, and both years saw monsoon disruptions. Crop GVA contracted, but the impact on inflation was different.

Unlike 2009, when food inflation spiked, inflation was rather muted in 2015 due to proactive food management, restrained MSP hikes, and a global commodity price slump, which kept inflation muted despite the monsoon failure, Ms. Deshpande noted.

Can India 'drought-proof' the economy?

Mr. Chouhan's presser raised an important data point: 315 districts are vulnerable to a poor monsoon, of which 111 across 12 States are of primary concern due to poor irrigation facilities.

On July 2, storage levels across the 166 reservoirs monitored by the Central Water Commission stood at 47.725 BCM, against 78.077 BCM in the corresponding period last year, and below the normal storage of 48.402 BCM for this time of year. While the system can provide water to meet requirements, a poor monsoon could strain it.

"A second successive bad weather will be more damaging," Prof. Ramaswami said, adding that irrigation is crucial in adapting to water stress due to climate change.

India needs to 'drought-proof' its economy, said Prof. Ramakumar. He said the country must move from crop insurance to ex-ante risk reduction. "We need to pay attention to policies and interventions that reduce risk itself. That requires public investment, and that's lacking," he said. He added that India needs enough drought-resistant, high-yielding crops, and that farmers must have access to them. "We have not invested adequately in any of these, and hence our disaster preparedness is very poor," he said.

THE GIST

- A weak monsoon and a potential super El Niño could reduce kharif output, depress rural incomes, fuel food inflation, slow GDP growth, and hurt exports.
- Experts say India must move beyond crop insurance by investing in irrigation, drought-resistant high-yielding crops, and other risk-reduction measures, as prolonged rainfall stress could strain water storage and disaster preparedness.

‘El Nino set to dent India’s wind, hydropower output’

Study projects rise in coal-fired power; it says weaker wind and hydropower output, combined with rising demand for air conditioning, could open a generation gap of nearly 18 TWh

Jacob Koshy
NEW DELHI

India’s power system stands to be strained more by the developing El Nino than that of any other country, according to an analysis by the think tank Centre for Research on Energy and Clean Air (CREA). It projects that weaker wind and hydropower output, combined with rising demand for air conditioning, could open a generation gap of nearly 18 TWh (terawatt hour) over a period of one year, till June 2027.

Set against India’s total electricity generation of about 1,846 billion units in 2025-26, the shortfall CREA models is small or under 1% of annual output. Non-fossil sources supplied 29.2% of that generation.

The group’s concern is less the size of the gap than how it is filled. The projected median output puts it at 17.7 TWh and its most severe at 24 TWh – one TWh is a billion units of electricity – and says the likeliest outcome is a surge in coal-fired power, which will release an estimated 17 million tonne of carbon dioxide. It stresses that these are scenario projections, not forecasts.

Generating power: A wind farm at Gudimangalam in Tiruppur district of Tamil Nadu. B. JOTHI RAMALINGAM

The India Meteorological Department (IMD) confirmed last month that El Nino conditions had emerged over the equatorial Pacific and were expected to strengthen through the monsoon.

It has forecast below-normal southwest monsoon rainfall at 90% of the long-period average, with a 60% chance of a deficient season.

June rainfall closed with an all-India rainfall deficit of about 40%, the fifth-lowest for June since 1901, and the cumulative shortfall stood at 20% below normal by July 6. IMD Director-General Mrutyunjay Mohapatra has said rainfall in July is likely to stay below normal across most of the country.

Record generation

India entered the season with record electric generation capacity. As on March 31, non-fossil installed capacity reached 283.46 GW – 150.26 GW of solar, 56.09 GW of wind, 51.41 GW of large hydro and 8.78 GW of nuclear – after a record 44.6 GW of solar and 6 GW of wind were added in 2025-26. Coal remains the largest single source of power, at about 42% of installed capacity, though coal generation fell 3.69% over the year. Peak demand touched 270.82 GW on May 21, according to official data.

CREA, which reports that solar now meets 24% of daytime demand, argues that storage could have absorbed more of it. Grid operators curtailed about 2.1 TWh of solar and wind last year to keep coal plants running – waste that CREA, citing energy analytics firm Ember, says roughly 10 GWh of battery storage could have averted.

India must “move much faster on batteries and grid upgrades”, said Nandikesh Sivalingam, CREA’s director, so that clean energy can meet future demand surges. The country is lining up around 130 GW of new coal capacity that provides on-demand power and helps buffer against record peaks such as in May.

CURRENTLY MAINS ONE-PAGER

EL NIÑO & SOUTHWEST MONSOON: RISKS TO INDIA'S ECONOMY, AGRICULTURE & ENERGY SECURITY

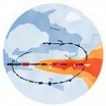
7 JULY 2026

I. CONTEXT

IMD has forecast a below-normal southwest monsoon (90% of LPA with ~60% probability of deficient season) amid El Niño conditions over the equatorial Pacific. A new study by CREAM projects that weaker wind and hydropower output, combined with rising demand for air conditioning, could open a **generation gap of nearly 18 TWh** over one year (till June 2027).

II. EL NIÑO: WHAT & HOW?

- El Niño is the abnormal warming of sea surface temperatures (SSTs) in the central & eastern equatorial Pacific.
- It alters atmospheric circulation (Walker circulation) → weakens moisture transport → weakens the Indian summer monsoon.
- Not every El Niño causes drought, but it significantly raises the risk of deficient rainfall.



III. EL NIÑO & SOUTHWEST MONSOON

- India has witnessed El Niño–associated deficient monsoons in 1972, 1982, 2002, 2009, 2014, 2015.
- June rainfall deficit was ~40%, the fifth-lowest for June since 1901.
- Cumulative all-India rainfall deficit (June till July 6): about 20% below normal.
- IMD expects July rainfall to likely remain below normal across most parts of India.

Key Numbers

- Total electricity generation (2025–26): ~1,846 billion units
- Solar added in 2025–26: 44.6 GW
- Wind added in 2025–26: 6 GW
- Large hydro capacity: 51.41 GW
- Nuclear capacity: 8.78 GW

IV. WHY INDIA IS VULNERABLE?

High dependence on monsoon	Nearly 50% of net sown area is still rain-fed. Agriculture employs ~45% of India's workforce and contributes ~15.4% to GVA (at current prices, FY25).
Water & hydropower constraint	Reservoir storage is uneven across states. Lower rainfall → lower hydropower generation and water availability for irrigation and drinking.
Energy mix vulnerability	Coal supplies ~29.2% of generation (largest single source; ~42% of installed capacity). Higher coal dependence → higher emissions and import needs.
Rising demand pressures	Peak demand touched 270.82 GW (21 May 2025). Rising AC penetration, urbanisation and industrial activity increase power stress risk.
Climate change amplifying risks	More frequent extreme events, erratic rainfall and higher temperatures intensify agriculture and energy vulnerabilities.

V. IMPACT ON INDIA: MULTI-DIMENSIONAL

Agriculture & Food Security	• Lower kharif crop output → lower rural incomes. • Higher food inflation (vegetables, pulses, oils) → pressure on CPI food basket. • Adverse impact on allied sectors – FMCG, agri-processing, rural employment.
Economy & Growth	• Rise in input costs (power, fertiliser, diesel) affects farm profitability. • Lower agricultural growth → drag on overall GDP. • Pressure on fiscal balances if compensation/support increases.
Energy Security	• Lower hydropower output. • Higher dependence on coal → higher imports and emissions. • Curtailment of solar & wind during peak demand affects reliability.
Water Security	• Lower reservoir levels and groundwater recharge. • Stress on drinking water supply in many regions. • Reduced availability for irrigation in rabi season.
Other Sectors	• Industrial output may be affected due to power constraints. • Health risks due to heat stress and poor air quality from higher thermal power use.

VI. WAY FORWARD: BUILDING LONG-TERM RESILIENCE

Water & Irrigation

- Expand micro-irrigation & water-use efficiency (Per Drop More Crop).
- Complete ongoing irrigation projects and raise irrigation coverage.

Agriculture

- Promote climate-resilient & drought-tolerant crop varieties.
- Diversify cropping systems and shift to less water-intensive crops.

Water Resource Management

- Strengthen reservoirs, tank rejuvenation, rainwater harvesting & groundwater recharge.
- Interlinking of rivers where feasible with ecological safeguards.

Energy Transition

- Invest in energy storage (pumped storage, batteries).
- Grid strengthening, smart grids and demand-side management.
- Accelerate renewable expansion with storage.

Climate Preparedness

- Improve forecasting, IMD's early warnings and real-time advisories.
- State/district-level contingency plans.
- Insurance (PMFBY) and risk transfer mechanisms.

Livelihoods & Governance

- Diversify rural livelihoods (horticulture, livestock, fisheries, millets).
- Strengthen PDS, buffer stocks and price stabilisation measures.

VII. MAINS VALUE ADDITION (GS III FOCUS)

Constitutional Provisions

- Article 48A – Protection & improvement of environment.
- Article 51A(g) – Fundamental duty to protect environment.
- Article 21 – Right to life includes right to a healthy environment (SC).

Key Government Initiatives

- PMKSY – Pradhan Mantri Krishi Sinchayee Yojana
- NMSA – National Mission for Sustainable Agriculture
- PMFBY – Pradhan Mantri Fasal Bima Yojana
- National Water Policy, 2012
- National Disaster Management Plan
- National Solar Mission; National Hydropower Mission

Key Concepts/Keywords

Climate variability | Monsoon dependence | Food security | Water security | Energy security | Inflation management | Disaster resilience | Climate risk

VIII. GS SYLLABUS MAPPING

GS – I (Geography)

- Climatology – ENSO (El Niño), Indian Monsoon
- Changes in critical geographical features
- Natural hazards & disaster management

GS – III (Economy)

- Indian economy & issues relating to planning
- Agriculture – irrigation, cropping patterns
- Food security & inflation
- Energy – sources, conservation, renewable energy
- Disaster management
- Conservation of natural resources
- Climate change & its impacts

IX. POSSIBLE MAINS QUESTIONS

- How does El Niño affect the Indian summer monsoon and what are its implications for agriculture and the economy?
- Discuss the impact of climate variability on India's energy security.
- What measures can India adopt to build long-term resilience against monsoon vagaries?

CONCLUSION El Niño-induced weak monsoon poses multi-dimensional risks to India's agriculture, water resources, food security, power sector and overall economic growth. Long-term resilience lies in climate-smart agriculture, efficient water management, energy transition, and robust disaster preparedness—not short-term relief alone.

PRESS INFORMATION BUREAU
GOVERNMENT OF INDIA

PIB ANALYSIS

(Currently: 7 July 2026, Tuesday)

1 SAHKAR SE SAMRIDDHI

Five Years of Strengthening India's Cooperative Movement

CONTEXT

Ministry of Cooperation, established on 6 July 2021, completes five years of driving "Sahkar Se Samriddhi" – cooperation for prosperity.

KEY HIGHLIGHTS

- Over 152 major initiatives launched since 2021.
- More than 50,000 PACS transformed into e-PACS.
- 47 grain storage godowns constructed.
- AI-powered Sahakar CBS & Sahakar Sahayogi (banking platform) launched.

TRANSFORMATION AT A GLANCE (as of June 2026)

8.5 lakh+	6.6 lakh	30	32 crore	98%
Registered Cooperatives	Functional Cooperatives	Sectors of Presence	Members Served	Coverage Across Rural India

BROADER IMPACT

Strengthening grassroots institutions, ensuring inclusive economic participation, and promoting self-reliant rural India through cooperative-led development.

2 AYUSHMAN BHARAT DIGITAL MISSION (ABDM)

India's Digital Health Backbone

CONTEXT

Launched in September 2021 to build a digital health ecosystem that ensures universal health coverage through digital infrastructure.

KEY ACHIEVEMENTS (as of May–June 2026)

93+ crore	104+ crore	5.26 lakh	9.21 lakh
ABHA Accounts	Health Records Linked	Health Facilities	Healthcare Professionals

CORE COMPONENTS

- ABHA: 14-digit Health ID
- Healthcare Professionals Registry (HPR)
- Health Facility Registry (HFR)
- National Health Claims Exchange (NHCX)
- Aarogya Setu 2.0 – Digital Health App
- Unified Health Interface (UHI)

Building a secure, interoperable and citizen-centric digital health ecosystem.

3 INDIAHANDMADE

A Digital Platform for India's Craft Heritage

CONTEXT

Launched in 2023 by Digital India Corporation under Ministry of Textiles to empower artisans and preserve India's handloom & handicraft legacy.

KEY STATISTICS (as of Aug 2025)

64.66 lakh+ Artisans Onboarded

71% Handloom Weavers are Women

64% Total Artisans are Women

KEY FEATURES

- Direct buyer access
- No intermediaries
- Digital empowerment
- Cultural preservation
- Financial empowerment
- Wide range of products
- Secure & transparent
- marketplace

Connecting artisans to markets.
Preserving heritage. Empowering livelihoods.

4 INDIA'S HAND IN ETHANOL EXPORTS

A New Energy Milestone

CONTEXT

India has started ethanol exports for the first time with the export of 2 lakh litres to the UAE.

HIGHLIGHTS

- First-ever ethanol consignment flagged off to UAE.
- Exports to six countries: UAE, Nepal, Bhutan, South Africa, Brazil, Australia.
- Supports 'Make in India, Make for the World' vision.
- A step towards energy security and global green energy leadership.

SIGNIFICANCE

- Boosts farmer incomes & rural economy
- Reduces crude oil import dependency
- Promotes clean energy & lower emissions
- Positions India as a global biofuel player

A milestone towards self-reliance and sustainable global leadership in green fuels.

ADDITIONAL HIGHLIGHTS OF THE DAY

- **Ministry of Cooperation Completes 5 Years**
  Established on 6 July 2021; driving inclusive growth through cooperatives.
- **ABDM Expands Digital Health Access**
  ABHA, HPR, HFR and UHI are strengthening India's digital health ecosystem.
- **IndiaHandmade Promotes Artisan Empowerment**
  Bringing artisans and buyers together on one global digital platform.
- **Ethanol Exports: India Goes Global**
  First export to UAE marks India's entry into the global biofuel market.

Data as per latest official updates available up to June–August 2025.