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India's Soil Crisis and the Imperative for Nutritional Agriculture

Context:

- **India has transformed from a food aid-dependent nation** in the 1960s to the world's largest rice exporter and the provider of the largest food distribution programme (PMGKY).
- However, this quantitative food security masks **a deeper qualitative crisis rooted in soil health**, which threatens nutritional outcomes and long-term agricultural sustainability.

India's Journey - Food Security Milestones:

- **Transformation from deficit to surplus:**
 - **1960s:** Dependent on US food aid under the PL-480 programme.
 - **2024-25:** Exported 20.2 million tonnes of rice in a 61 MT global market.
 - **PM-Garib Kalyan Yojana (PMGKY):** Provides 5 kg free rice/wheat/month to over 800 million people.
 - **Food Corporation of India (FCI) stockpile:** It holds about 57 MT of rice — the highest stock in 20 years and nearly four times the buffer norm of 13.54 million tonnes as of July 1, 2025.
- **Reduction in poverty:** The extreme poverty head count (those earning less than \$3/day at 2021 PPP) dropped from 27.1% in 2011 to just 5.3% in 2022.

The Hidden Crisis - Malnutrition Persists:

- **National Family Health Survey (NFHS 5) (2019-21) indicators:**
 - 35.5% of children under five years of age are stunted, 32.1% are underweight, and 19.3% are wasted.
 - This reflects failure to achieve nutritional security, despite caloric sufficiency.
- **Nutrient deficiency in crops:** Poor soil health leads to nutrient-deficient crops, which fuels micronutrient malnutrition, especially among children.

Degrading Soil Health - A Silent Emergency:

- **Soil Health Card (SHC) scheme (2024 data):** Of more than 8.8 million soil samples tested, less than 5% have high or sufficient nitrogen (N), only 40% have sufficient phosphate (P), 32% have sufficient potash (K) and just 20% are sufficient in soil organic carbon (SOC).
- **SOC - A vital indicator:**

- **SOC** is a critical parameter defining the physical, chemical, and biological properties of soil — these govern its holding capacity and nutrient use efficiency.
- As per the Indian Institute of Soil Science (IISC), **SOC in the range of 0.50-0.75% is adequate.**
- **Micronutrient deficiencies:**
 - Indian soils also suffer from a deficiency of sulphur, as well as micronutrients like **iron, zinc and boron.**
 - They contribute to stunting and long-term health issues.

Fertiliser Imbalance - A Misguided Practice:

- **State-level imbalance:**
 - **Punjab:** N overused by 61%, K deficient by 89%.
 - **Telangana:** N overused by 54%, K deficient by 82%.
 - The situation is similar in several other states. The highly imbalanced use of N, P and K and the neglect of micronutrients leads to suboptimal agricultural productivity.
- **National consequences:** The fertiliser-to-grain response ratio/ **fertilizer use efficiency** has declined significantly from 1:10 in the 1970s to a mere 1: 2.7 in 2015. This leads to suboptimal yield and soil fatigue.
- **Environmental hazards:**
 - **Urea inefficiency:** Only 35–40% N absorbed.
 - Rest lost as greenhouse gases (N₂O, which is 273 times more potent than CO₂) or as nitrate contamination of groundwater.
 - Urea diversion to non-agricultural or cross-border use compounds the problem.

The Way Forward - Towards Nutritional Agriculture:

- **Public health link:** Soil health directly impacts human nutrition, making this an agricultural and public health concern.
- **Need for a paradigm shift:**
 - Shift from blanket fertiliser application to **customised**, soil-specific nutrient planning.
 - Emphasise science-based **fertilisation** strategies informed by soil testing and crop-specific needs.
- **New collaborations and innovations:** ICRIER (Indian Council for Research on International Economic Relations) and OCP Nutricrops partnership – Aims to promote region-specific, data-driven solutions to boost soil and crop nutrition, and enhance crop productivity.
 - OCP Nutricrops brings cutting-edge expertise in soil nutrition and fertiliser solutions aimed at addressing global challenges in sustainable food production.

Conclusion - Healing the Soil for a Healthy Nation:

- India's food and nutritional security now depends on **addressing the soil nutrient crisis.**
- Sustainable development demands that we **move beyond food quantity to food quality, starting with rejuvenating the soil** — the foundation of human health and national prosperity.

India's Soil Crisis and the Imperative for Nutritional Agriculture FAQs

Q1. How did India become the world's largest rice exporter?

Ans. Through the Green Revolution, public procurement, buffer stocks, and schemes like PM-GKAY.

Q2. Why does child malnutrition persist despite food surplus?

Ans. Because of poor crop nutrition, soil deficiencies, and focus on calories over nutrients.

Q3. How does soil health affect human nutrition?

Ans. Nutrient-poor soils lead to deficient crops, causing hidden hunger and stunting.

Q4. What are the effects of fertiliser imbalance in India?

Ans. It reduces crop yield, pollutes groundwater, and emits potent greenhouse gases.

Q5. Can science-based fertiliser use restore soil and food quality?

Ans. Yes, customised nutrition plans and partnerships like ICRIER-OCP can boost both.

Source: **IE**

India Can Reframe the Artificial Intelligence Debate

Context

- **Less than three years ago, ChatGPT catapulted artificial intelligence (AI)** out of research labs and into living rooms, classrooms, and parliaments.
- The **sudden public visibility of AI created waves that leaders could not ignore and** in response, global **AI summits emerged rapidly**, highlighting both the urgency and the uncertainty surrounding this transformative technology.
- When **New Delhi hosts the AI Impact Summit in February 2026**, the event can transcend symbolic diplomacy.

The Geopolitical Landscape and India's Approach to AI

- **Fractured Geopolitical Landscape**
 - The **Paris AI Summit of February 2025**, which aimed to unify the world on AI governance, **ended in discord**, marked by the United States and the United Kingdom rejecting its final text, while China embraced it.
 - **These divisions risk turning what should be a cooperative effort** for humanity's digital future into a fragmented contest of interests.
 - **India, with its strategic position** and credibility across multiple geopolitical blocs, **is well placed to act as a bridge.**
 - By developing inclusivity and dialogue, **India can prevent AI governance from becoming a domain of competing spheres of influence**, ensuring that AI benefits the global majority.

- **A Democratic Approach to AI**

- **India's Ministry of Electronics and Information Technology** began preparing for the summit with **a uniquely democratic approach**.
- In June 2025, it launched **a nationwide consultation through the MyGov platform**, inviting students, researchers, startups, and civil society groups to contribute ideas.
- The **agenda emerging from this process focuses on three key goals**: advancing inclusive growth, accelerating development, and protecting the planet.
- This **consultative framework has provided India with a distinctive advantage**, unlike past summit hosts, it is building an agenda rooted in broad-based participation and grassroots innovation.

Actionable Proposals for the New Delhi AI Impact Summit

- **Pledges and Report Cards**

- India's success with digital infrastructure, such as Aadhaar's secure identity system and the Unified Payments Interface (UPI), illustrates how **technology can serve everyone, not just the privileged**.
- The summit can borrow this **spirit of accountability by encouraging each delegation to make a clear, measurable pledge** for the year following the summit.
- These could range **from reducing data centre energy consumption to offering AI-based educational programs** for rural communities.
- Public scoreboards tracking these pledges would **replace empty press releases with transparent progress reports**.

- **Elevating the Global South**

- **At the first global AI summit**, nearly half of humanity, primarily **the Global South, was absent from leadership discussions**.
- **India, as a voice for the Global South, must ensure equitable representation** this time.
- A proposed **AI for Billions Fund**, supported by development banks and Gulf investors, could provide cloud credits, fellowships, and local-language datasets for underserved communities.
- **Hosting a multilingual AI model challenge for 50 low-resource languages would send a powerful message**: innovation is not confined to Silicon Valley or Beijing; it is universal.

- **Establishing a Common Safety Check**

- Since the **Bletchley AI Safety Summit of 2023**, experts have advocated for red-teaming and stress-testing AI models.
- While **many countries have formed national AI safety institutes**, no shared global checklist exists.
- India could lead the **creation of a Global AI Safety Collaborative to standardise red-team scripts**, incident logs, and safety benchmarks for high-capacity models. An open evaluation toolkit could strengthen trust and transparency.

- **Charting a Balanced Regulatory Path**

- The **U.S. fears overregulation**, Europe pushes for stringent laws through its AI Act, and China favours centralised state control.

- **Most nations, however, seek a middle ground.** India could propose a voluntary yet enforceable code of conduct for frontier AI.
- **Building on the Seoul pledge, this code could require disclosure of compute resources** above a certain threshold, the publication of external red-team results within 90 days, and the creation of an accident hotline.
- Such steps would **promote accountability** without stifling innovation.
- **Preventing Fragmentation**
 - The **AI ecosystem risks splintering along geopolitical lines**, with the U.S. and China locked in a technological rivalry.
 - While New Delhi cannot dissolve these tensions, **it can soften their impact by ensuring that the summit's agenda remains broad**, inclusive, and focused on collective global benefit.

India's Role and Identity

- India is **not aiming to build a global AI authority overnight**, nor should it.
- Instead, **it can integrate existing frameworks**, develop collaboration, and position itself as a leader in sharing AI capacity with the world's majority.
- By transforming participation into tangible progress, **India will not merely host a summit, it will redefine its identity as a proactive force on one of the most critical frontiers** of the 21st century.

Conclusion

- The AI Impact Summit of 2026 presents India with **a unique diplomatic and technological opportunity**.
 - Through transparent pledges, inclusive representation, shared safety standards, balanced regulation, and resistance to fragmentation, **India can guide AI governance toward equity and sustainability**.
 - In doing so, **it will not only influence the trajectory of AI but also reaffirm its role as a bridge-builder** in an increasingly divided world.
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Reform Cannot Wait; Aviation Safety is at Stake

Context

- The **preliminary report of the Aircraft Accident Investigation Bureau (AAIB)** on the Air India Boeing 787 crash in Ahmedabad on June 12, 2025, **released on July 12, highlights significant uncertainties regarding pilot actions**.
- However, **the real issue extends beyond individual culpability to a systemic lack of trust** in India's aviation ecosystem.
- This **distrust stems from a recurring pattern** where aviation personnel face disproportionate penalties while regulators, airlines, and oversight bodies escape equivalent scrutiny.

India's Aviation Framework: A Fractured Aviation Ecosystem

- India's aviation framework involves **a complex interplay of components**: aircraft design, airworthiness, maintenance, and the professionals operating these systems, including engineers, pilots, and cabin crew.
- These **operational aspects are managed by airlines**, while the **Airports Authority of India (AAI) oversees airport infrastructure and air traffic control**.
- The Directorate General of Civil Aviation (DGCA) regulates airlines, airport operators, and the AAI, under the **supervisory oversight of the Ministry of Civil Aviation (MoCA)**.
- Despite these layered responsibilities, **aviation accidents seldom arise from a single failure**.
- Instead, **as per the Swiss cheese model, they occur when multiple systemic gaps align**, allowing a critical lapse to escalate into a disaster.

Judicial Interventions and Regulatory Loopholes in India's Aviation Sector

• Judicial Interventions and Safety Advocacy

- Judicial interventions have **occasionally proven lifesaving, as evidenced in the 2018 Ghatkopar crash in Mumbai**, where earlier court-ordered restrictions on construction near airports prevented potentially greater casualties.
- **Mumbai's airspace exemplifies the hazards of regulatory neglect, with over 5,000 vertical obstructions** within a four-kilometre radius, a clear violation of the Inner Horizontal Surface (IHS) safety criteria.
- Despite ongoing PILs, **the number of obstacles near critical air routes has soared, reflecting the opacity and possible misrepresentation by the DGCA, AAI, airport operators, and MoCA**.
- This **illustrates a judiciary forced to compensate for administrative failures**, yet often constrained by its reliance on state-provided technical expertise.

• Regulatory Loopholes and Dangerous Precedents

- The **deterioration of safety standards can be traced back to policy changes**.
- Until 2008, airspace around airports was tightly regulated under the Aircraft Act and Statutory Order 988 of 1988, which **prohibited hazardous constructions**.
- However, **the creation of a non-statutory committee in 2008 diluted these safeguards**, approving illegal building heights through flawed aeronautical studies.
- **By 2015, obstacles not only posed physical risks to aircraft but also interfered with radar and communication systems**.
- Instead of tightening controls, **the 2015 Rules granted statutory recognition to the very committee responsible for height violations**.
- The **MoCA's amendment to limit the no-objection certificate (NOC) validity to 12 years**, without outlining measures for demolishing illegal floors, epitomizes bureaucratic evasion of responsibility.
- **Similar violations now plague greenfield projects** like Navi Mumbai and Noida airports, where operational runways are compromised due to surrounding obstructions.

Systemic Failures Across Key Areas

- **Aircraft Design and Airworthiness:** The DGCA's limited technical expertise forces excessive reliance on foreign regulators, as highlighted during the 2017–18 Pratt & Whitney engine failures affecting IndiGo.
- **Maintenance Standards**
 - Aircraft Maintenance Engineers (AMEs) face **extreme workloads** without duty-time limitations.
 - **Airlines are permitted to delegate AME responsibilities to underqualified, lower-paid technicians**, prioritising cost-cutting over safety.
- **Flight Crew Fatigue**
 - Airlines **routinely breach Flight Time Duty Limitations for pilots**, with DGCA exemptions allowing fatigued crews to operate.
 - The **unique NOC requirement for pilots restricts their career mobility**, increasing psychological stress and regulatory coercion.
- **Cabin Crew Neglect:** The reduction of cabin crew roles to hospitality functions ignores their vital role in passenger safety.
- **Air Traffic Management:** The AAI grapples with a severe shortage of Air Traffic Controller Officers (ATCOs), a crisis worsened by the non-implementation of licensing provisions and duty-time limitations recommended after past crashes.
- **Suppression of Whistle-Blowers:** Retaliation against safety whistle-blowers fosters a culture of silence, allowing violations to persist unchecked.

The Judiciary's Role and the Value of Human Life

- **The judiciary**, often hailed as India's constitutional safeguard, **has been relatively passive in aviation safety matters**.
- Courts **tend to defer to the technical expertise of state agencies**, despite evidence of systemic negligence.
- A **shift is needed in how human life is valued**; compensation for railway and road accidents often amounts to mere lakhs of rupees, enabling stakeholders to rationalise safety investments as financially unnecessary.
- A **revaluation of human life and its intrinsic worth is critical to motivating systemic safety**

Conclusion

- The Air India crash in Ahmedabad is a **stark reminder that systemic failure in aviation is not a distant threat but an immediate reality**.
- **Without a comprehensive reform** encompassing regulatory accountability, **mental health support for crew, and strict adherence to safety standards, the next disaster is inevitable**.
- The **judiciary, government, and airlines must work in unison to develop a genuine safety culture, one that places lives above profit margins** and bureaucratic convenience.
- Reform cannot wait; every delay risks another tragedy.