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DAILY NEWS ANALYSIS

APRIL 27

CONSISTENT COMPREHENSIVE AND CREDIBLE

UNIQUE AND BEST IN QUALITY

How AI helped community-led development in Rajasthan

A project to improve water resilience in two Rajasthan districts strengthened existing government efforts by using AI to improve last-mile responsiveness; the application was also lightweight enough to sit inside any large programme that depends on frontline behaviour change and local coordination

Sachiradipta Bhattacharjee
Alan Nicol

Technology must empower the human intermediary, like the community volunteer water champions in the AI4WaterPolicy project, rather than replace them. (GETTY IMAGES)

India is in an artificial intelligence (AI) moment. Across agriculture, health, finance, and governance, the race is on to deploy AI-enabled services that reach the last mile. Chatbots answer farmer queries. Agentic tools navigate entitlement schemes. And advisory platforms push the right information to the right person (presumably) at the right time.

Many of these tools share a similar logic. While exceptions exist, they are often designed around the assumption that communities have an information deficit that AI can fill. But what if that's not all communities need?

In public services, the gap is not always between people and information. It is often between people and the local institutions meant to serve them. India's villages are shaped by the complexities of caste, class, gender, and land ownership. Numbers alone cannot track what actually makes an intervention work. Why a volunteer stops showing up, what makes a woman hesitate to speak in a Gram Sabha, and why an approved plan isn't being implemented rarely makes it back to the people designing and funding these programmes.

This is not because institutions don't want qualitative information. In many cases, they simply lack the means, time, and resources to consistently gather it at scale.

Different questions for AI

The authors designed a pilot project, called AI4WaterPolicy, in the water-stressed Sirohi and Pali districts of Rajasthan. And rather than deploy AI to push information outwards, the project used it to listen.

Working with a field partner, Centre for Microfinance (CmF), and technology partner Colectiv, an AI model conducted 232 interviews across 50 villages in six months. The team had trained the model using a brief of the programme content and the questions it needed to know.

The AI chatbot then held 20-minute WhatsApp conversations in Hindi and local dialects via voice notes or text with 'Pani Mitras' (community volunteer water champions), Panchayat leaders, and CmF's frontline staff. Follow-up questions were adapted to each respondent on the fly. The model finally translated anonymised transcripts and organised them thematically, after which the field and research team reviewed and validated them.

The answers revealed three things:

(i) **Pride in the results**: "Water level in my village, which was at 150 feet, has now come to below 100 feet. This is a matter of great pride for me";

(ii) **The double burden for women**: "I manage my family by waking up early, then I visit other women in the village to discuss water-related issues. After returning home, I resume my household work"; and

(iii) **Funding and approval delays**: "Because of delayed approval of proposals in the Panchayat department, we could not complete the work on time".

The project then deployed 'Pani Mitras' to address these issues. During the project's structured workshops to share and discuss findings with respondents, called 'Pause and Reflect' sessions, participants validated some interpretations and pushed back on others. Mainly, they said their limited understanding of Panchayat procedures and government schemes was a challenge.

In reply, CmF redesigned its training programme mid-cycle to add a Panchayati Raj orientation programme and structured workshops with block-level officials from rural development, agriculture, and water resources departments. This pivot was not part of the original plan. It happened because the AI model helped the project turn insights around quickly enough to act within the same programme cycle.

Follow-up interviews with 'Pani Mitras' three months after the workshops found that more than half of the community members had since engaged directly with government officials – something many had hesitated to do before.

They reported more confidence navigating scheme application processes and mentioned the feedback had prompted their Panchayat or department to act more quickly.

The AI4WaterPolicy pilot succeeded not just because of the algorithms used but also because its organisers budgeted time, funds, and people to return findings to respondents and co-develop follow-up actions

Listening with intent

There is an important distinction here: responsive systems and actively listening systems are not the same thing. The former takes community input as a signal and returns an answer. The latter is shaped by what it hears and the community moves from being a passive beneficiary to an active co-designer.

In this pilot, AI made active listening possible in three ways. First, a voice-enabled WhatsApp channel gave 'Pani Mitras' a private space to speak freely. As one respondent put it, "When a person is in front of you, you feel hesitant. On your own phone, there's no hesitation." Second, the AI model identified recurring themes across 232 conversations without requiring weeks of manual coding. Third, because the findings were synthesised within weeks, the implementing team could redesign training mid-cycle. Traditional monitoring can't easily provide such responsiveness.

The AI4WaterPolicy pilot succeeded not just because of the algorithms used but also because its organisers budgeted time, funds, and people to return findings to respondents and co-develop follow-up actions. CmF had also spent years working in these villages, identifying and training the 'Pani Mitras'. During the interviews, their staff facilitated access to shared devices for participants without smartphones, helped navigate connectivity problems, and ensured the 'Pause and Reflect' sessions were genuine deliberations. The AI could listen at scale precisely because human relationships had already created the conditions necessary for honest conversations.

Empower, not replace

The digital divide is real and manifests in gender, class, and caste-based differences, and any honest conversation about AI and the last mile must reckon with this reality. Technology must empower the human intermediary, like the 'Pani Mitras', rather than replace them. This was not a one-off pilot from Rajasthan. The approach strengthened and complemented existing government efforts by enhancing feedback loops and improving last-mile responsiveness. It was also lightweight enough to sit inside any large programme that depends on frontline behaviour change and local coordination.

Policies, programmes, and systems like Jal Jeevan Mission, VB-G RAM G, and sectoral extension systems all include such last-mile implementation.

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Alan Nicol is a Principal Researcher at IWMI. A.Nicol@cgiar.org)

THE GIST

- The authors designed a pilot project, called AI4WaterPolicy, in the water-stressed Sirohi and Pali districts of Rajasthan
- The AI chatbot held 20-minute WhatsApp conversations in Hindi and local dialects via voice notes or text with 'Pani Mitras' (community volunteer water champions), Panchayat leaders, and CmF's frontline staff
- The AI could listen at scale precisely because human relationships had already created the conditions necessary for honest conversations

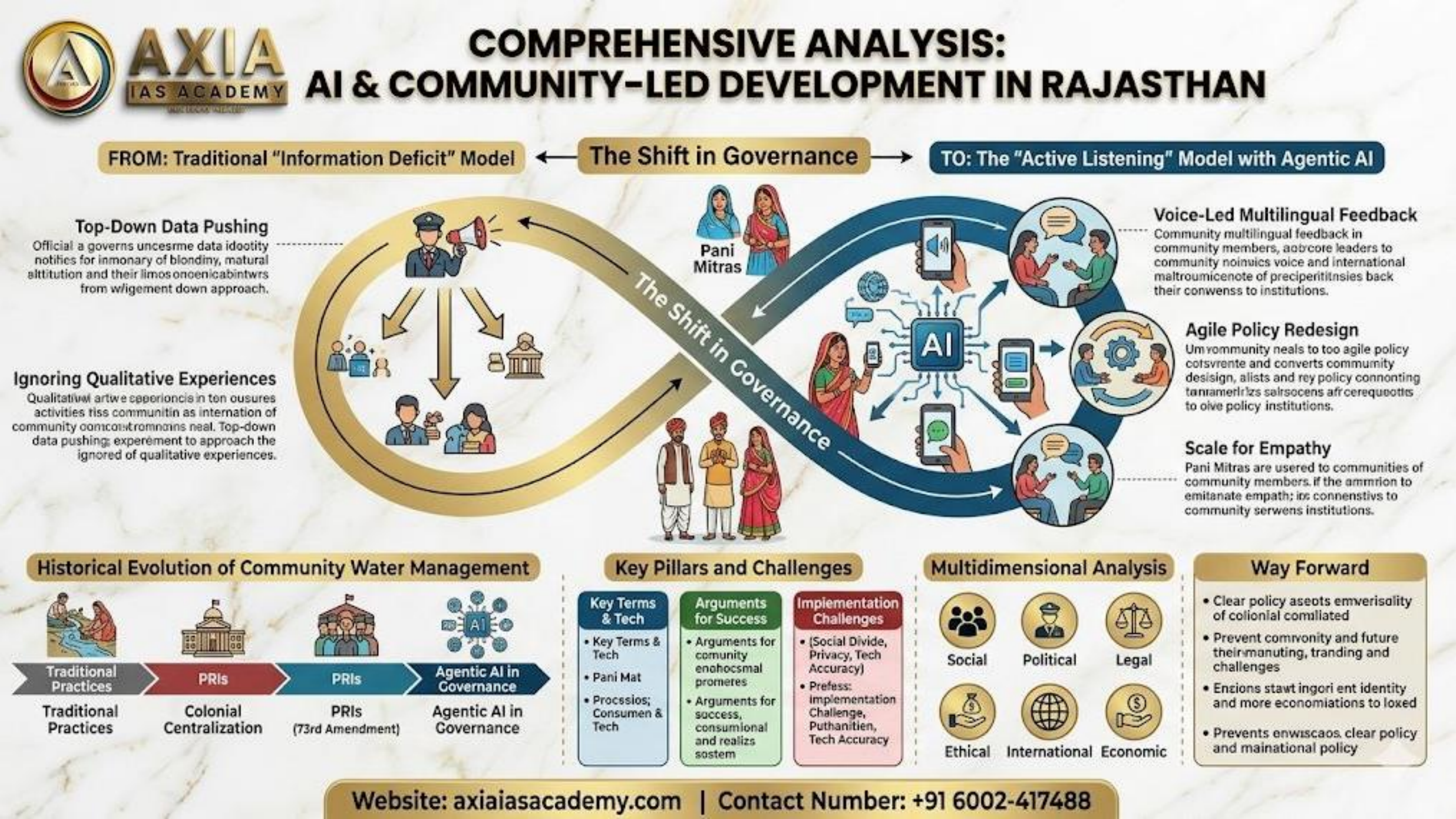
- **Key Terms and Explanations**
- **Last-Mile Responsiveness:** The ability of the government or service providers to effectively meet the needs of the final recipient in the most remote areas.
- **Water Resilience:** The capacity of a community to survive and thrive in the face of water-related shocks, such as droughts or depleting groundwater.
- **Agentic AI Tools:** AI systems designed not just to provide information but to act as "agents"—facilitating conversations, translating dialects, and organizing data to drive specific outcomes.
- **Pani Mitras:** Community volunteer "water champions" who act as intermediaries between technology and the local population.
- **Information Deficit vs. Listening Deficit:** A shift in focus from the idea that "people lack information" to the realization that "institutions lack the means to listen" to people's qualitative experiences.

- **Main Arguments and Substantive Parts**
- The core thesis posits that AI's greatest utility in development is not replacing humans, but amplifying human voices to make institutions more responsive.
- **The "Listening" Model:** Unlike traditional chatbots that push alerts, the **AI4WaterPolicy** pilot used AI to conduct 352 interviews via voice notes in local dialects. This bypassed literacy barriers and allowed for "listening at scale."
- **Findings of the Pilot:**
  - **Pride vs. Scarcity:** Local successes (e.g., water levels rising) are sources of community pride that data-only metrics often miss.
  - **The Double Burden:** Technology revealed that women face unique time-poverty, managing household water needs before dawn, which impacts their participation in governance.
  - **Bureaucratic Delays:** The AI identified specific "bottlenecks" in funding and approvals that frustrated local progress.
- **Agile Governance:** Because the AI synthesized themes rapidly, the project could redesign training mid-cycle. This "Pause and Reflect" mechanism turned community input into immediate policy adjustments.

- **Historical Evolution of the Issue**
- **Pre-Independence:** Traditional water harvesting (e.g., *Johads*, *Baoris*) was community-managed but lacked institutional support.
- **Post-Independence (1950s-80s):** Shift toward large-scale "command and control" structures (dams, canals). Governance was centralized and top-down.
- **73rd Amendment (1992):** Constitutional status given to Panchayats, theoretically decentralizing water management, though "last-mile" feedback remained weak.
- **The Digital India Era (2014-Present):** Initially focused on connectivity (BharatNet); now evolving into "GovTech" where AI is used to bridge the linguistic and literacy divide in rural service delivery.

- **Way Forward**
- **Hybrid Models:** Integrate AI tools into existing schemes like **Jal Jeevan Mission** to track "functional" versus "installed" infrastructure.
- **Capacity Building:** Train a cadre of "Digital Mitras" at the village level to act as the bridge between technology and the elderly/non-literate.
- **Data Sovereignty:** Ensure that the data collected from communities remains their property and is used primarily for their local benefit.

- **Previous Years' Questions (PYQs)**
- **UPSC 2020 (GS 2):** "The Fourth Industrial Revolution (Digital Revolution) has initiated E-Governance as an integral part of government." Discuss.
- **UPSC 2017 (GS 2):** "The expectation setting out from the 73rd and 74th Amendments to the Constitution of India has not been adequately fulfilled."
- **UPSC 2018 (GS 3):** "How can the use of ICT in Indian agriculture help the farmers?" (Similar logic applies to water/rural development).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COMPREHENSIVE ANALYSIS:
AI & COMMUNITY-LED DEVELOPMENT IN RAJASTHAN
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The Shift in Governance
TO: The "Active Listening" Model with Agentic AI
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Pani Mitras
The Shift in Governance
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Historical Evolution of Community Water Management
Traditional Practices
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Agentic AI in Governance
Traditional Practices
Colonial Centralization
PRIs (73rd Amendment)
Agentic AI in Governance
Key Pillars and Challenges
Key Terms & Tech
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CULTURE

How a 'lost tribe' in Northeast India forged ties with Israel

Nikita Mohta
New Delhi, April 26

AROUND 250 members of the B'nei Menashe Jewish community of Manipur and Mizoram, who claim descent from one of the "10 lost tribes of Israel", landed in Tel Aviv last week.

The B'nei Menashe, numbering around 7,000, belong to the Mizo and Kuki tribal communities across the two states. Though thousands of community members have migrated to Israel since the 1990s, the batch that arrived in Israel last week was the first to go under an Israeli government relocation programme. More are supposed to follow them.

What are the lost tribes of Israel?

Around 722 BCE, the Assyrian empire conquered northern Israel and resettled many of the people living there. According to Jewish tradition, the banished people were part of 10 tribes — Reuben, Simeon, Dan, Naphtali, Gad, Asher, Issachar, Zebulun, Ephraim and Manasseh. For centuries, Western Jews have searched for the descendants of these "lost tribes" around the world, including in the Indian subcontinent.

The Jewish community of Mizoram and Manipur believes it is descended from the largest of these tribes — Manasseh. B'nei Menashe literally means "sons" of Menashe or Manasseh. The community's members believe their exiled tribe headed east, wandering for centuries through Persia (modern-day Iran) and Afghanistan before settling in what is today Northeast India.

How did Christianity pave the way for Judaism?

Academic Gideon Elazar, in *Jewish Communities in Modern Asia* (2023), writes: "The identification of different groups of people in the region of upland Southeast Asia... as remnants of the tribes began with the highly successful efforts of Protestant missionaries in the mid-nineteenth century."

LONG PROCESS

- A Jewish organisation called Shavei Israel supported the migration of the community to Israel from the 2000s to 2020
- Since 2020, another organisation called Degel Menashe has emerged. Unlike earlier groups, it is run by members of the B'nei Menashe community

In 1951, a Mizo mystic named Challianthanga, or Mela Chala, claimed he had seen in a dream that Mizos, Kukis and Chins were descendants of ancient Israelite tribes, said Sayan Lodh, a PhD researcher at Presidency University, Kolkata, whose research focuses on Judaising movements in India. The Judaising movement among the Chin-Kuki-Mizo tribes in Manipur and Mizoram actively developed after the late 1970s, he told *The Indian Express*. According to Lodh, propelling the movement was an Israeli organisation called Amishav, led by a Rabbi called Eliyahu Avichail, which aimed to bring all the scattered tribes to Israel "to fulfill the conditions for the coming of the Messiah".

The Mizo Israel Zionist Organization, to establish ties with Jews and the state of Israel, was founded in 1974. Lodh said the locals gradually began to research Israel, contacted the Jewish communities of Bombay and Calcutta, and even sent a letter to the Knesset (the Israeli Parliament). "By the 1980s, their transformation into Judaism was complete, with help from Amishav," said Lodh.

How were relations with modern Israel established?

It was Rabbi Avichail who saw a connection between the Biblical figure of Menashe and an ancestral figure invoked by the Kukis (Manmasi) and Mizos (Manasia).

Avichail and others also set out to demonstrate that the B'nei Menashe maintained oral traditions associating them with the land of Israel, as well as certain Jewish practices.

In 2005, Lodh said, the Chief Rabbinate of Israel (the ultimate authority on Jewish religious matters within Israel) declared the B'nei Menashe the "Lost Seed of Israel", officially recognising them as a lost tribe, based on inconclusive DNA evidence produced by scientists in Kolkata.

However, scientists at the Technion-Israel Institute of Technology in Haifa rejected these results and conducted their own tests, which were also inconclusive. In both cases, traces of the Cohen modal haplotype (a genetic marker found in some individuals identifying as Cohanim) were detected in a few samples.

These findings, along with the Rabbinate's ruling, led Israel to permit the migration of the B'nei Menashe to Israel.

- **Key Terms and Explanations**
- **B’nei Menashe:** Literally "Sons of Menashe." It refers to a group within the Mizo, Kuki, and Chin communities of Mizoram and Manipur who claim descent from the lost biblical tribe of Manasseh.
- **Ten Lost Tribes:** According to Jewish tradition, these were the tribes of the northern Kingdom of Israel that disappeared after the Neo-Assyrian conquest in roughly 722 BCE.
- **Aliyah:** The immigration of Jews from the diaspora to the Land of Israel. It is a core tenet of Zionist ideology.
- **Chief Rabbinate of Israel:** The supreme spiritual and legal authority for Judaism in Israel. Their recognition is crucial for being considered "Jewish" under religious law.
- **Cohen Modal Haplotype:** A specific genetic signature found on the Y-chromosome, often used in population genetics to trace paternal lineages related to the Jewish priesthood (Cohanim).
- **Law of Return (1950):** An Israeli law giving Jews the right to come to Israel and settle as citizens. The B’nei Menashe’s migration often involves complex legal navigation of this law.

- **Main Arguments and Substantive Parts**
- The article posits that the B’nei Menashe identity is a blend of ancient oral tradition and a 20th-century religious "awakening."
- **The Thesis of Descent:** The core claim is that the community migrated from Israel through Persia and Afghanistan, eventually settling in the Indo-Burma borderlands.
- **Role of Modern Mysticism:** The movement gained momentum in 1951 after a local mystic’s dream, which reinterpreted tribal customs through a Judaic lens.
- **The "Christian Bridge":** Paradoxically, 19th-century Protestant missionary work in Northeast India is cited as a catalyst. By introducing the Bible, missionaries provided the linguistic and theological framework that allowed the community to later identify with the Old Testament tribes.
- **State and Religious Recognition:** While the Israeli Rabbinate recognized them as "Lost Seed of Israel" in 2005, the scientific community remains divided due to inconclusive DNA evidence.

- **Historical Evolution of the Issue**
- **722 BCE:** Assyrian conquest leads to the exile of the northern tribes.
- **19th Century:** British missionaries convert Mizo-Kuki-Chin tribes to Christianity, familiarizing them with Israelite history.
- **1951:** Chalianthanga's vision triggers the "return to Judaism" movement.
- **1970s:** Organizations like **Amishav** and the **Mizo Israel Zionist Organization** formalize ties with Israel.
- **2005:** The Chief Rabbinate of Israel officially recognizes the community, facilitating mass migration.
- **Present:** Ongoing government-led relocation programs amidst regional instability in Northeast India.

- **Way Forward**
- **Documentation:** Better ethnographic and historical documentation of the Kuki-Mizo-Chin history to bridge the gap between myth and record.
- **Cultural Integration:** Programs in Israel to ensure B'nei Menashe are not marginalized upon arrival.
- **Diplomatic Clarity:** India and Israel should maintain a transparent framework for these migrations to ensure they are voluntary and do not complicate the security situation in the Northeast.

- **Previous Years' Questions (PYQs)**
- **UPSC GS II (2018):** "India's relations with Israel have, of late, acquired a depth and diversity, which cannot be rolled back." (Discuss in context of cultural/people-to-people ties).
- **UPSC GS I (2014):** "How does patriarchy impact the status of women in tribal societies?" (Can be adapted to discuss how Jewish lineage/Rabbinical law impacts tribal structures).
- **UPSC GS I (2020):** "Customary individual rights, which were once the basis of tribal life, are being replaced by the power of the state."

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UNDERSTANDING THE B'NEI MENASHE: IDENTITY & MIGRATION

KEY TERMS & EXPLANATIONS

1.1 B'NEI MENASHE
B'niei community and minutes from tribal in Be'nei Menashe

1.2 TEN LOST TRIBES
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1.3 ALIYAH
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1.4 CHIEF RABBINATE
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1.5 COHEN MODAL HAPLOTYPE
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1.6 LAW OF RETURN
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HISTORICAL EVOLUTION

722 BCE: ASSYRIAN EXILE

600 BCE: MISSIONARY EXILE

1 BCE: MYSTIC MISSSIONARY

RBCC: MYSTIC DREAMING

PRESENT: MIGRATION & MANIPUR STRIFE

IDENTITY CONSTRUCTIVISM

TELEOLOGICAL FULFILLMENT

THE CHALLENGE: IDENTITY v. EVIDENCE

EPSSTEMOLOGY: FAITH-BASED CLAIM vs. GENETIC EVIDENCE

CHALLENGES

- Integrity
- Security
- Security insidance
- Consiids and moouations

WAY FORWARD & UPSC RELEVANCE

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CONNECTIONS TO GS I, OPTIONALS

- GS I, II, IV, (Anthropology/ optiology optionals
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SCIENCE

Role heat and humidity play in India's firecracker factory blasts

Arav Shah
New Delhi, April 26

TWO SEPARATE firecracker accidents killed dozens of people last week. On April 21, at least 14 people were killed in Kerala's Thrissur district after two explosions, seconds apart, ripped through a firework assembly unit. The incident, which came days ahead of the Thrissur Pooram festival, prompted the state government to scrap the annual event's famed fireworks display.

On April 19, a massive explosion at a fireworks factory in Tamil Nadu's Virudhunagar district left at least 23 people dead. Virudhunagar manufactures 90% of the fireworks in India.

The Kerala government has ordered a judicial probe into the Thrissur incident. In the Virudhunagar incident, investigators are expected to examine potential safety lapses or mishandling of combustible chemicals.

India regularly sees explosions in firecracker factories. In the firework manufacturing hub of Virudhunagar, for instance, more than 100 people died in firecracker unit accidents between 2022 and mid-2025. While part of the reason for such accidents lies in the chemical raw materials themselves, climate, safety violations and lack of enforcement also play a key part.

How a firework functions

There are four components in a firecracker: an oxidiser, fuel, 'stars' and a binder. The oxidisers are chemicals that release oxygen to allow the explosion to take place. The most commonly used oxidisers are nitrates, chlorates and perchlorates. The core explosive is generally black powder, a mixture comprising 10% sulphur, 15% charcoal, and 75% potassium nitrate.

The oxidiser breaks down the chemical bonds of the fuel, releasing energy and heat — in other words, causing the explosion.

The 'stars' are solid chemical lumps responsible for creating the bright colours and light usually associated with fireworks. Aluminium compounds produce brilliant whites, barium nitrate produces greens and the addition of copper results in blue light. Binders are used to hold the mixture of the firecracker together in a paste.

Dangerous combination

- Dry heatwaves in the day with heightened humidity in the mornings and evenings can introduce moisture into the facilities
- If moisture interacts with poorly stored chemical compounds, it can trigger an exothermic reaction

How weather affects safety

The primary risk in handling such volatile chemicals in large quantities together is the accumulation of static energy.

Low-humidity environments prevent the safe dissipation of static charges in the air, which is exacerbated in the summer. As a result, basic movements on the factory floor, such as mixing dry chemical powders or sliding materials across a workbench, can generate an invisible static spark capable of igniting ambient chemical dust.

Virudhunagar, for instance, is located in a hot, arid area that sees little rainfall because of the Western Ghats barrier.

However, it's not just dry weather that poses a danger.

The variability of high, dry heatwaves in the day with heightened humidity in the mornings and evenings may introduce moisture into the facilities. If moisture interacts with poorly stored chemical compounds, it can trigger a reaction.

In standard, safe procedures, chemical slurries mixed with water must be dried carefully under shadow platform sheds to avoid dangerous heat accumulation. However, if dampness seeps into volatile chemical piles, which are subsequently baked dry by the intense summer sun, the chemicals become highly unstable and can spontaneously combust.

Even without an explosion, stagnant summer heat effectively traps the toxic chemical dust generated during the mixing process close to the ground, drastically increasing the oxidative potential of the air.

The human factor

The explosion risk on the factory floor is compounded by a system where workers are paid by the pieces produced, driven by market demand. This piece-rate system can incentivise speed over safety protocols.

Over the past decade, probe into numerous explosions have found raw, volatile materials and finished fireworks stockpiled in cramped, unventilated spaces far beyond the legally permissible limits.

- **Key Terms and Explanations**
- **Oxidiser:** Chemicals (nitrates, chlorates) that provide oxygen to sustain a fire or explosion, allowing it to occur even without atmospheric oxygen.
- **Exothermic Reaction:** A chemical reaction that releases energy through light or heat. In poorly stored firecracker chemicals, moisture can trigger this prematurely.
- **Static Electricity/Energy:** An imbalance of electric charges within or on the surface of a material. In dry conditions, this charge cannot "leak" into the air, leading to sparks that ignite chemical dust.
- **Black Powder:** A traditional explosive mixture containing sulfur, charcoal, and potassium nitrate (saltpeter).
- **Piece-rate System:** A wage structure where workers are paid per unit produced rather than per hour. This often leads to "speed-over-safety" behavior.
- **Stagnant Summer Heat:** High ambient temperatures that trap toxic dust and increase the "oxidative potential" of the air, making combustion easier.

- **Main Arguments and Substantive Parts**
- The core thesis posits that firecracker accidents are not merely "accidents" but the result of a **dangerous triad**: volatile chemistry, specific climatic triggers, and systemic labor exploitation.
- **The Climate-Chemical Nexus:** The article argues that the combination of dry heatwaves (promoting static sparks) and high morning/evening humidity (triggering exothermic reactions) creates a volatile environment for nitrates and binders.
- **Mechanical Igniters:** Basic movements, like sliding materials across a workbench, become lethal in low-humidity environments because the air fails to dissipate static charges.
- **Systemic Safety Lapses:** Beyond the weather, the "human factor"—specifically the piece-rate wage system—drives workers to bypass safety protocols to meet market demand, often stockpiling finished goods in unventilated, cramped spaces.
- **The "Shadow" Drying Paradox:** While chemicals must be dried under shade to prevent heat accumulation, any seepage of moisture can lead to spontaneous combustion when subsequently exposed to the sun.

- **Historical Evolution of the Issue**
- **Pre-Independence:** The industry began as a small-scale craft, largely unregulated, centered around Sivakasi (Tamil Nadu) due to its dry climate, which was ideal for drying products.
- **1980s–90s:** Rapid expansion fueled by growing domestic festivals and the shift toward the "Virudhunagar-Sivakasi" hub, which now produces nearly 90% of India's fireworks.
- **Post-2000s:** Increased judicial scrutiny. The Supreme Court began intervening on environmental grounds (air pollution/green crackers), but the focus on "worker safety" remained secondary to "product chemistry."
- **Present Day:** Frequent mass-casualty events (e.g., Kerala 2024, Tamil Nadu 2024) have moved the needle toward demanding stricter enforcement of the **Explosives Act** and better disaster management at the district level.

- **Way Forward**
- **Automated Climate Monitoring:** Factories should be mandated to install hygrometers and thermometers that trigger alarms when static risk reaches critical levels.
- **Infrastructure Reform:** Transitioning from "sheds" to climate-controlled, well-ventilated modular units to prevent dust accumulation.
- **Formalization of Labor:** Replacing the piece-rate system with a fixed-wage + safety-bonus model to reduce "rushed" handling.
- **District-Level Task Forces:** Moving beyond annual inspections to monthly "Safety Audits" by a multi-disciplinary team (fire, labor, and chemical experts).

- **Previous Years' Questions (PYQs)**
- **UPSC Mains (2019, GS 3):** "Vulnerability is an essential element for defining disaster impacts and its threat to people. How and in what ways can vulnerability to disasters be characterized?"
- **UPSC Mains (2017, GS 3):** "Chemical disasters are as much a result of human error as they are of technical failure. Discuss."
- **UPSC Mains (2013, GS 3):** "With reference to the National Disaster Management Authority (NDMA) guidelines, discuss the steps to be taken to manage the possibilities of chemical disasters."

UNDERSTANDING INDIA'S FIRECRACKER FACTORY BLASTS: A CONPREHENSIVE ANALYSIS FOR UPSC

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KEY TERMS

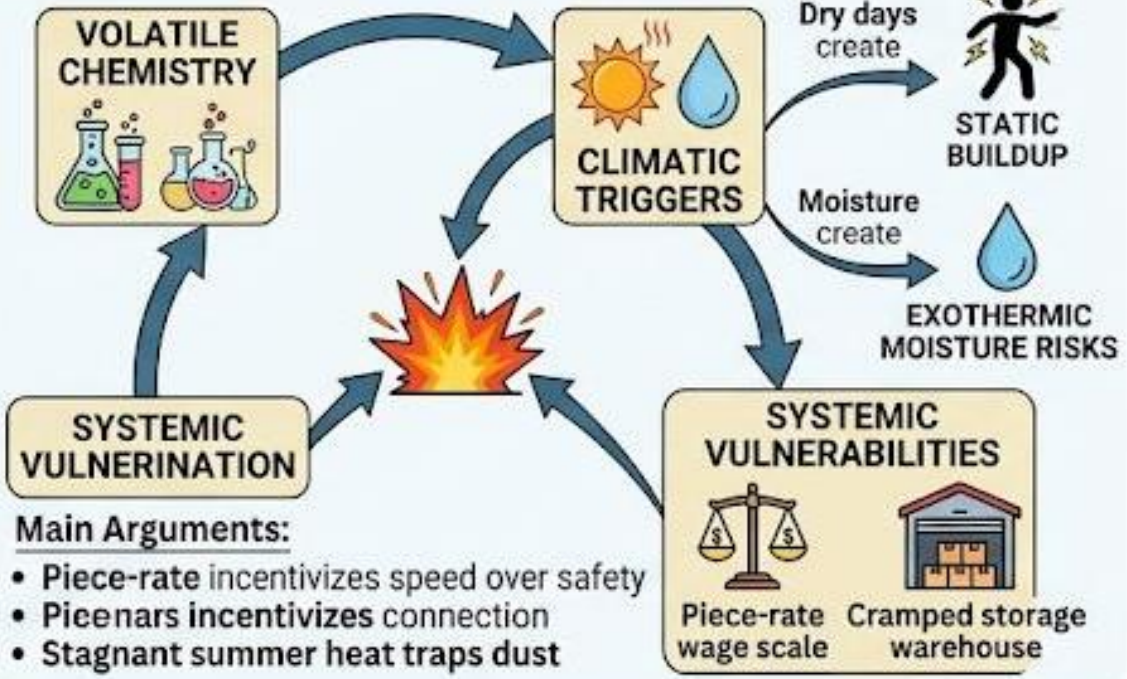
OXIDISER

EXOTHERMIC

STATIC ELECTRICITY

DANGEROUS COMBINATION

(the 'Dangerous Triad')



Main Arguments:

- Piece-rate incentivizes speed over safety
- Pieenars incentivizes connection
- Stagnant summer heat traps dust

HISTORICAL EVOLUTION TIMELINE

- **1980s** – Growth understored heating ofsunsed camtory growth
- **2000s** – Compaevention to forecttirenf firecracker blasts
- **2007s** – Marn interventional factory cramped to warehouse
- **2021** — Recent SC interventions to accest **firecracker "factory blasts**
- **Now** — Major blasts of **firecracker factory leading blasts**

WAY FORWARD

Automated Climate Monitoring

Infrastructure Reform

Formalization of Labor

District-Level Task Forces

MULTIDIMENSIONAL ANALYSIS

ECONOMIC

- Unorganized Sector Risks
- Explasnal femats sourced ar not informage darabiity

LEGAL

- Explosives Act Enforcement Gaps
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ETHICAL

- Normalized Workplace Deaths
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Stronger Syllabus Links →

UPSC SYLLABUS LINKAGES

- GS3 → Disaster Mgmt, Econ Reforms
- GS1 → Geography, Industrial location
- Stronger → Essay

• CLIMATE

Why below-average rains don't rule out flood threat

The new monsoon worry is the number of extreme rainfall events. Rainfall has been happening in shorter and more intense spells

AMITABH SINHA

THE INDIA Meteorological Department (IMD) has said the country will receive only 92% of normal rainfall this monsoon. However, this forecast does not capture the intra-seasonal and regional variations in rainfall, a standard feature of the Indian monsoon.

The below-normal rainfall forecast, for example, is no indicator of the number of extreme rainfall events likely to occur this coming season. Such events have been steadily increasing over the last decade or two, and have routinely turned into, or triggered, large-scale disasters. Several studies have linked the increasing trend of such incidents in recent years to climate change.

In the past decade or so, starting with the Kedarnath tragedy in 2013, India has seen at least one major rainfall-related disaster every year. In some years, like 2023, there have been multiple such incidents. The overall extent of monsoon rainfall over the country as a whole has had no bearing on the frequency or severity of extreme rainfall events. Such disaster-inducing rainfall incidents have happened even in the years when the overall rainfall during the season was relatively low, like in 2015, 2018 or 2023.

Climate impact

IMD classifies any rainfall above 21 cm in a 24-hour period as extremely heavy rain. Typically, such events account for less than 0.1% of all recorded rainfall events in the country. But their number seems to be increasing. In the four-year period between 2008 and 2011, for example, the maximum number of extremely heavy rainfall events in any season was 64 (in 2008), according to IMD's Annual Monsoon Reports. This number has been consistently above 100 every year since 2017. In 2024, as many as 181 extreme rainfall events were recorded, while last year this number was 160.

Part of this rise in the numbers can be attributed to a lowering of the threshold for a rainfall incident to qualify as extremely heavy. Before 2016, only rainfall above 244.5 mm in a 24-hour period was classified as extremely heavy. This was lowered to 204.5 mm (sometimes rounded off as 21 cm) in 2016. But the increasing trend of such incidents is evident even at the higher threshold level.

More than the frequency, the increasing intensity of extreme rainfall events is a cause for worry. Rainfall has been happening in shorter, and more intense, spells than earlier, raising chances of triggering a disaster.

A disaster a year

For more than a decade now, India has seen at least one major rainfall-induced disaster during the monsoon. Some of these, like the Jammu and Kashmir flooding of 2014, the Chennai urban flooding of 2015 and the Kerala floods of 2018, have been record-breaking, once-in-a-century, or once-in-50-years kind of events.

Almost every major city in the country — Delhi, Mumbai, Pune, Chennai, Bengaluru, Hyderabad, Kochi, Ahmedabad, Jaipur, Srinagar, Chandigarh, Gurgaon, Lucknow, Guwahati, Kolkata — has seen at least one major flooding event in the last 10 years, many classified as disasters. Cities like Chennai, Bengaluru, and Mumbai have witnessed multiple such events during this time.

Part of the blame for this urban flooding can, of course, be put on poor urban planning, unregulated development, constraction on flood-plains, water bodies, or water channels, and municipal apathy. But it is also true that many of these disaster situations were triggered by unprecedented rainfall events.

In the first week of September 2014, for example, Jammu and Kashmir received record-breaking rainfall. The overall rainfall for the month of September turned out to be the highest in over 100 years. The resultant floods, possibly the worst ever in the last one century, killed over 280 people, damaged more than 2.5 lakh houses, and destroyed around 6.5 lakh hectares of crop area according to official estimates.

Similarly, the 2018 Kerala flooding in August was triggered by exceptionally high rainfall, the maximum since 1931, according to IMD records. Bengaluru has seen its 24-hour highest rainfall record broken twice in the last 10 years.

Difficult to predict

Such extraordinarily high rainfall is extremely difficult to predict. In many such cases, the IMD can see the chances of very heavy rainfall and issue appropriate alerts, but whether the eventual rainfall would be in the range of 250 mm or 500 mm cannot be said with any reasonable degree of certainty. This is an inherent limitation of weather science. Weather is an extremely chaotic system, with very small changes in initial conditions giving rise to big differences in the end result.

A denser observational network, better modelling, and an increase in computational capabilities can help improve the forecast, but eliminating uncertainty altogether is not possible. The more granular the forecast, in time as well as in location, the greater is the uncertainty.

It is fairly established now that climate change is further exacerbating this uncertainty. Under the influence of climate change, extreme weather events have become more frequent and more intense, posing a much bigger challenge to meteorologists.

This trend is being seen globally, not just in India. And it is not restricted to rainfall events. Other weather events, like drought or heat waves, have also been showing a similar trend.

Managing rain-induced disasters

Until a few years ago, the possibility of rainfall deficiency was the biggest concern of policymakers during the monsoon season. That is because the potential of drought had serious implications for food security, rural incomes, and overall economy. Over the years, India has become more resilient to rainfall deficiencies and has been able to minimise their impact.

But excessive, localised rainfall, particularly in large, densely populated, urban agglomerations, has emerged as the new headache during the monsoon, and needs urgent attention. Since the Chennai floods of 2015, a variety of agencies have been working together to reduce the risks of urban flooding in major cities, but the results are yet to be seen. To a large extent, it is an urban planning and municipal governance issue. But its impact is big.

Floods in general, not just urban flooding, killed nearly 17,500 people in the 10-year period between 2012 and 2021, according to a government statement in response to a question in Rajya Sabha in 2023. The report of the Sixteenth Finance Commission pointed out that floods accounted for over 10% of all expenditure on disasters by states between 2019-20 and 2023-24.

Besides, disruption in cities like Delhi, Mumbai, Bengaluru, or Chennai has very large economic consequences, apart from the direct toll on life and property.

• Major rainfall-triggered disasters

• Extreme heavy rainfall events

Year	Extremely Heavy Rainfall Incidents (>21 cm in 24-hour period)	Number of stations reporting record-breaking rainfall events (over 24 hours)
2016	89	12
2017	113	16
2018	126	12
2019	164	21
2020	144	14
2021	111	36
2022	132	43
2023	159	28
2024	181	28
2025	160	26

SOURCE: IMD ANNUAL MONSOON REPORTS

Rising trend

Starting with the Kedarnath tragedy in 2013, India has seen at least one major rainfall-related disaster every year

•

The overall extent of monsoon rain has had no bearing on the frequency or severity of extreme rainfall events

- **Key Terms and Explanations**
- **Indian Meteorological Department (IMD):** The principal agency responsible for meteorological observations, weather forecasting, and seismology.
- **Extremely Heavy Rainfall:** Defined by the IMD as rainfall exceeding **21 cm (210 mm)** within a 24-hour period.
- **Monsoon Deficiency:** When the total seasonal rainfall is less than the long-period average (LPA). Traditionally, a "below-normal" forecast (e.g., 92% of LPA) suggested lower flood risks, a logic now challenged by climate change.
- **Intra-seasonal Variation:** Fluctuations in rainfall within a single monsoon season (e.g., long dry spells followed by sudden, violent downpours).
- **Urban Heat Island (UHI) Effect:** A phenomenon where cities experience much higher temperatures than surrounding rural areas due to concrete structures, leading to localized convection and intense rain.

- **Main Arguments and Substantive Parts**
- The core thesis is that **total rainfall volume is no longer a reliable predictor of flood safety.** Even in "drought" years, the risk of catastrophic flooding remains high due to specific shifts in rainfall patterns.
- **Frequency vs. Intensity:** While total volume might be low, the number of "extremely heavy" events is rising. Rainfall is now concentrated into shorter, more intense "bursts" rather than being spread evenly over four months.
- **The "New Normal" of Disasters:** Since 2013, India has witnessed at least one major rainfall-triggered disaster annually, regardless of whether the monsoon was "surplus" or "deficient."
- **The Urban Planning Crisis:** Natural drainage systems in cities have been replaced by concrete, meaning even moderate rainfall can trigger "urban flash floods."
- **Predictive Limitations:** Current meteorological models struggle to predict the exact "granularity" of extreme events (e.g., whether a city will receive 200mm or 500mm in a day), leading to a gap in early warning effectiveness.

- **Historical Evolution of the Issue**
- **Pre-Independence to 1980s:** Rainfall was viewed primarily through the lens of **food security**. A "below-normal" monsoon meant famine or drought; floods were viewed as localized riverine overflows.
- **2005 Mumbai Floods:** A watershed moment that highlighted **urban vulnerability** to extreme "cloudburst-like" events in a coastal metropolis.
- **2013 Kedarnath Tragedy:** Signaled a shift in the Himalayan ecosystem, where extreme rain coupled with unregulated construction led to massive loss of life.
- **2015–Present:** A period characterized by "paradoxical years." For example, 2015 was a drought year for India, yet Chennai suffered its worst floods in a century. This period marks the formal recognition of **Climate Change** as a primary driver of monsoon volatility.

- **Way Forward**
- **Nature-Based Solutions:** Restoration of wetlands and urban forests to act as natural shock absorbers.
- **Blue-Green Infrastructure:** Integrating water bodies (Blue) and parks (Green) into the city's drainage master plan.
- **Modernizing the IMD:** Investing in **Doppler Weather Radars** and supercomputing for higher resolution "Nowcasting."
- **Floodplain Zoning:** Statutory backing for zones where no permanent construction is allowed.
- **Community Resilience:** Training local volunteer groups for "First Response" since extreme events leave little time for centralized aid.

- **All Previous Years' UPSC Questions**
- **Mains 2021 (GS3):** "Describe the various causes and the effects of landslides. Mention the important components of the National Landslide Risk Management Strategy."
- **Mains 2020 (GS1):** "How do ocean currents and water masses differ in their impacts on marine life and coastal environment? Give suitable examples." (Context of IOD/Monsoon).
- **Mains 2016 (GS3):** "With reference to the National Disaster Management Authority (NDMA) guidelines, discuss the measures to be adopted to mitigate the impact of recent incidents of cloudbursts in many places of Uttarakhand."
- **Mains 2014 (GS3):** "Drought has been recognized as a disaster in view of its spatial expanse, temporal duration... Focus on the September 2014 floods in Jammu and Kashmir."

THE AXIA IAS ACADEMY
MONSOON & FLOOD THREAT INSIGHT.

KEY FINDINGS

- Focus on Below-average rain doesn't rule out flood threat.
- The monsoon gatt anitation rea need **climate changes** and **exputation** of extremed srainfall solutions andimnors or:nmore climate sesoon.
- The monsoon spelts can be retorted to maineve rainfall sinrager in calurtrame pattern's resperation.

UNDERLYING CAUSES

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Infrastructure Gaps
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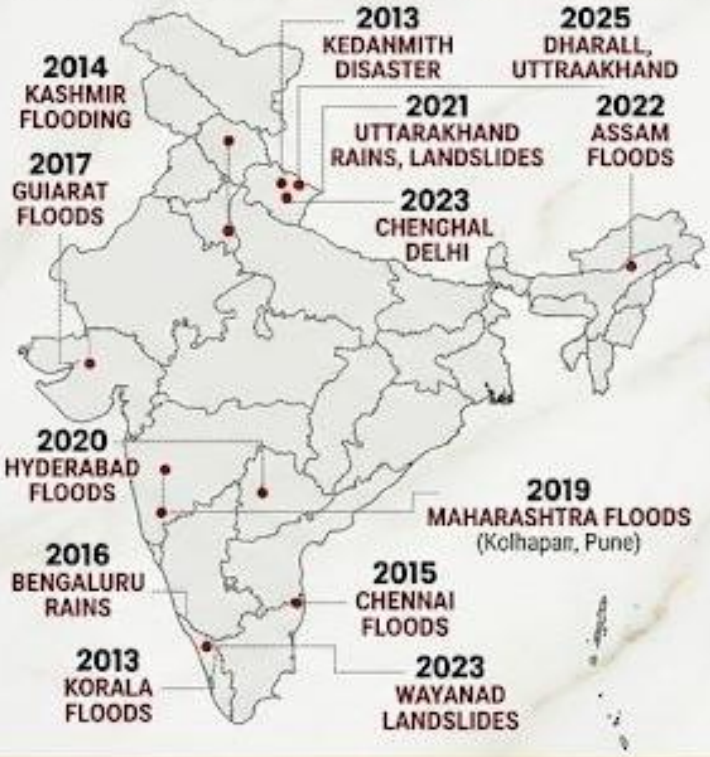
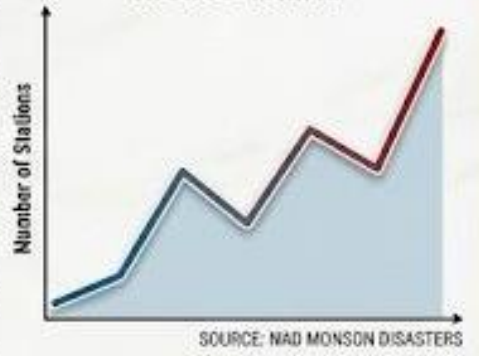
DISASTER TIMELINE MAP OF INDIA



EXTREME RAINFALL STATISTICS

Year	Extremely Heavy Rainfall (-21 lm in 24 hour period)	Number of record breading record events (over 24 hours)
2016	69	12
2017	113	16
2018	128	12
2019	144	21
2020	144	13
2025	181	43



CHALLENGES

- **Predictability limits:** measureing ɐeturnants for ahinon apathy.
- **Admin apathy:** improvement admin apathy and oparaces ontor mas nainfall foreven.

Natural Drain blockage in an urban setting

WAY FORWARD

- **Policy recommendations:** resilience uncvens troarding and advancentstrument.
- **Resilience building:** recommınations, lang, enablling, to aonale meraronel and enlance solutions.
- **Policiests building:** ensutive resiliences to racombanding, **resilience** building.

New Zealand, India to sign free trade pact today; tariffs to be removed on all exports

T.C.A. Sharad Raghavan
NEW DELHI

India and New Zealand will on Monday sign a Free Trade Agreement that will remove tariffs on 100% of India's exports to New Zealand, and either sharply reduce or remove tariffs on 95% of current imports from that country.

Commerce Minister Piyush Goyal on Saturday took to social media to welcome Todd McClay, New Zealand's Minister for Trade & Investment, to New Delhi, ahead of the signing of the pact.

"As we approach the #IndiaNZFTA signing on April 27th, his visit marks a defining moment in our bilateral journey, reflecting the trust, shared values, and common vision that underpin our partnership for sustainable economic growth, driving prosperity for both our nations," he said.

Union Minister Piyush Goyal welcomes Todd McClay, New Zealand's Minister for Trade and Investment on Friday. X/@PIYUSHGOYAL

India's exports to New Zealand grew 32.1% in 2024-25 to $711.1 million, the latest full financial year for which there is data. Imports from New Zealand grew 75.2% to $587.1 million over the same period.

The deal will provide India with immediate duty-free access on 100% of tariff lines. This is down from the 10% tariff New Zealand currently levies on about 450 tariff lines that India exports, including textiles and apparel products, leather and headgear, ceramics, carpets, and auto mobiles and auto components. On average, New Zealand levied a tariff of 2.2% in 2025, which will come down to zero under the agreement.

The pact between the countries is one of the fastest-negotiated trade agreements that India has entered into, with negotiations being announced in March 2025 and concluding in December.

India has also managed to keep several items out of the FTA, including all dairy products such as milk, cream, whey, yoghurt, and cheese, animal products other than sheep meat, vegetable products such as onions, chana, peas, corn, and almonds, sugar, artificial honey, animal, vegetable or microbial fats and oils, arms and ammunition, gems and jewellery, and copper and aluminium and their products.

The FTA includes a provision wherein New Zealand will invest $20 billion in India over 15 years.

The deal also includes provisions relating to the mobility of working professionals and students. Indian students can work up to 20 hours per week while studying in New Zealand, with extended post-study work visas.

India has offered New Zealand exporters market access in 70.03% of the tariff lines with 30% of these lines seeing tariffs being immediately removed while the rest will see a phased removals or reductions.

According to the New Zealand government, 95% of the country's current exports will see tariffs either reduced to zero or sharply reduced.

- **Key Terms and Explanations**
- **Free Trade Agreement (FTA):** A pact between two or more nations to reduce barriers to imports and exports. Under an FTA, goods and services can be bought and sold across international borders with little or no government tariffs, quotas, or subsidies.
- **Tariff Lines:** These are specific product categories in a country's customs schedule. Removing tariffs on "100% of tariff lines" means every single category of goods exported from India to New Zealand will now enter duty-free.
- **Rules of Origin (RoO):** (Implicit in FTAs) Criteria used to determine the national source of a product. This prevents third-party countries from "routing" goods through a free-trade partner to avoid duties.
- **Market Access:** The extent to which a country permits imports. In this pact, India has offered access to roughly 70% of its tariff lines, a significant opening for a traditionally cautious market.
- **Post-Study Work Visas:** Provisions that allow international students to stay and work in a host country after graduation, serving as a "bridge" between education and migration/professional contribution.

- **Main Arguments and Substantive Parts**
- The core thesis of this development is the shift from protectionism to **strategic economic integration**.
- **Trade Liberalization:** The removal of a 10% average tariff on Indian exports (textiles, apparel, leather, etc.) aims to make Indian manufacturing globally competitive.
- **Investment Security:** A commitment of $20 billion in investment from New Zealand into India over 15 years provides a long-term capital cushion for infrastructure and development.
- **Services and Mobility:** The agreement moves beyond "goods" to "people," easing student work hours and professional mobility, recognizing "Human Capital" as a tradeable asset.
- **Defensive Interests:** India’s exclusion of the dairy sector (milk, cheese, whey) highlights a sensitive "red line," protecting the livelihoods of millions of small-scale Indian dairy farmers from New Zealand's massive dairy industry.

- **Historical Evolution of the Issue**
- **Pre-1991:** India operated under "License Raj" with high tariff walls and an inward-looking import substitution model.
- **1991 Reforms:** Liberalization, Privatization, and Globalization (LPG) shifted the focus toward export-led growth.
- **Look East to Act East:** India began engaging more deeply with the Indo-Pacific region, though New Zealand remained a smaller trading partner compared to Australia or ASEAN.
- **The RCEP Exit (2019):** India withdrew from the Regional Comprehensive Economic Partnership (RCEP) due to concerns over Chinese goods and dairy imports from NZ/Australia.
- **The "New Era" of Bilateralism (Present):** Following the India-Australia ECTA, this pact signifies India's preference for high-quality bilateral deals over large, multilateral ones where it lacks a competitive edge.

- **Way Forward**
- **Domestic Competitiveness:** Lowering the "Cost of Business" (logistics, electricity) so Indian goods can actually compete at zero tariffs.
- **Awareness Campaigns:** The Ministry of Commerce should launch "FTA Clinics" for MSMEs to explain how to use these new provisions.
- **SPS and TBT Measures:** Strengthen Indian testing labs to ensure exports meet New Zealand’s high sanitary and phytosanitary standards.
- **Monitoring Mechanism:** A joint "Grievance Redressal Committee" to tackle non-tariff barriers that might crop up post-signing.

- **Previous Years’ Questions (PYQs)**
- **UPSC 2017 (GS3):** "What is the meaning of the term 'Free Trade Area'? Highlight the prospects and challenges India faces in its trade relations with other countries."
- **UPSC 2020 (GS2):** "Critically examine the reasons for India's withdrawal from the Regional Comprehensive Economic Partnership (RCEP)."
- **UPSC 2023 (GS2):** "The 'Indo-Pacific' is a strategic concept that has gained prominence in recent years. Discuss India’s role in this region."

AXIA IAS ACADEMY: Comprehensive Analysis - India-New Zealand Free Trade Agreement

KEY PROVISIONS & ECONOMIC IMPACT

1. FOR INDIA (THE WINNERS)

- Zero Tariffs on 100% of Exports
- Major Goods - Textiles, Apparel, Leather, Gems & Jewellery
- Simplified Rules of Origin

Textile loom

Gems

2. NEW FEATURE - INVESTMENT

- $20 Billion New Zealand Investment over 15 years
- Long-term capital for infrastructure

Money Bag

Cityscape

SERVICES & MOBILITY (Human Capital Focus)

- Indian students can work up to 20 hrs/week

Graduation Cap Laptop

- Post-Study Work Visas

GLOBAL SIGNIFICANCE

- Post-RCEP shift to bilateral strategy. Indo-Pacific strategic shift.

DEFENSIVE INTERESTS (Strategic Trade)

- Dairy sector excluded from the deal (milk, cheese, whey) to protect small Indian farmers

At *Chintan Shivir*, DNT enumeration in Census discussed

Abhinay Lakshman
NEW DELHI

The Ministry brought together Centre and State officials to discuss the future of its schemes for marginalised sections

The Social Justice Ministry on Sunday concluded a three-day "*Chintan Shivir*" (brainstorming session), during which the inclusion of denotified, nomadic, and semi-nomadic tribes (DNTs) in the ongoing Census 2027 exercise was one of the key focus areas.

The DNT communities have been demanding a separate column or question in the Census forms, specifically to account for their populations across the country. Community leaders are also mobilising support for a separate Schedule for DNTs on a par with the lists of Scheduled Castes, Scheduled Tribes, and Other Backward Classes. The Supreme Court dismissed a petition last month seeking a Census question for DNTs and a separate classification for them, leaving them the liberty to approach the government on the matter.

During the *Chintan Shivir*, the Social Justice Ministry brought together Centre and State government officials to discuss the future of its schemes for marginalised sections through panel discussions, breakout sessions and thematic meal sessions.

Social Justice Minister Virendra Kumar said on Sunday that the sessions were "a serious and result-oriented platform for the Centre, States and Union Territories to reflect collectively on how social justice delivery can be made more accessible, responsive and implementation-driven".

The brainstorming session also discussed scholarship and hostel schemes for SC and OBC students, comprehensive support for transgender people and how to align schemes for them with the new amendments enacted by Parliament in 2026. While a central focus of the sessions on DNT welfare was the principal bottleneck issue of State and Union Territory governments not providing DNT community certificates, hindering their access to schemes, across different sessions, the issue of obtaining an accurate count of DNT populations across the country also kept coming up, officials said.

This comes even as members of Centre's Development Welfare Board for DNTs raise concerns over the lack of clarity on their enumeration in the ongoing Census. "As of now, we don't know if there will be a column for OBCs. So we don't know if there will be a DNT column as well or how this is going to be done," one Board official said.

- **Key Terms and Explanations**
- **Denotified Tribes (DNTs):** These are communities that were "notified" as "born criminals" under the British-era **Criminal Tribes Act (1871)**. After independence, this Act was repealed in 1952, and they were "denotified."
- **Nomadic and Semi-Nomadic Tribes:** Communities that do not have a fixed habitation and move from one place to another. Semi-nomadic tribes are those who are nomadic for part of the year.
- **Chintan Shivir:** A high-level brainstorming session or retreat where policymakers and stakeholders gather to discuss strategy and address systemic bottlenecks.
- **Enumeration:** The process of counting or mentioning one by one. In the context of the Census, it refers to the official recording of population data based on specific categories.
- **DWBDNT:** The Development and Welfare Board for Denotified, Nomadic and Semi-Nomadic Communities, a body under the Ministry of Social Justice and Empowerment.

- **Main Arguments and Substantive Parts**
- The core debate centers on the **formal recognition and statistical visibility** of DNTs in the National Census.
- **The Demand for Data:** DNT communities are advocating for a separate column in the Census. Without an accurate count, the government cannot allocate proportional resources or design targeted schemes.
- **The Constitutional Parity Argument:** Leaders argue for a separate **Schedule** for DNTs, similar to Scheduled Castes (SCs) and Scheduled Tribes (STs). This would provide them with a distinct legal identity and constitutional protection.
- **Implementation Bottlenecks:** A significant hurdle is the lack of "Community Certificates." Since many DNTs are nomadic and move across state lines, they struggle to provide the "domicile" or "caste" proof required by state governments to access benefits.
- **The Judicial Stand:** While the Supreme Court recently dismissed a petition for a mandatory Census column, it left the door open for the Executive to decide, shifting the responsibility to the Ministry of Social Justice.

- **Historical Evolution of the Issue**
- **Colonial Era (1871):** The Criminal Tribes Act was enacted, branding over 200 communities as hereditary criminals. This led to systemic social ostracization and police surveillance.
- **Post-Independence (1952):** Based on the **Ayyangar Committee** recommendations, the 1871 Act was repealed and replaced by the **Habitual Offenders Act**. While the "criminal" label was legally removed, the social stigma remained.
- **The Kalelkar Commission (1953) & Mandal Commission (1980):** These touched upon the backwardness of these groups but often categorized them under the broader OBC or SC/ST umbrellas, diluting their specific needs.
- **Renke Commission (2008):** The first comprehensive report to highlight that DNTs are the "poorest of the poor" and recommended a separate census and reservation.
- **Idate Commission (2015):** Further emphasized the need for a permanent commission and a dedicated survey to identify DNTs accurately.

- **Way Forward**
- **Uniform Identification:** Create a national master list of DNT communities to resolve the SC/ST/OBC overlap confusion.
- **Special Census Methodology:** Use GPS-tagging or "point-in-time" counts during the 2027 Census to capture nomadic populations.
- **The "SEED" Scheme Strengthening:** The Scheme for Economic Empowerment of DNTs (SEED) needs higher budgetary allocation and simplified application processes.
- **Sensitization of Law Enforcement:** Mandatory training for police forces to dismantle the "hereditary criminal" mindset.

- **Previous Years' Questions (PYQs)**
- **UPSC Mains (2023, GS2):** "The formalizing of a separate commission for DNTs is a step toward inclusive growth. Discuss." (Similar theme)
- **UPSC Mains (2018, GS2):** "Whether the National Commission for Scheduled Castes can address the problems of the Denotified Tribes effectively? Comment."
- **UPSC Prelims (2016):** Question regarding the 'Criminal Tribes Act' and its repeal.

AXIA
IAS ACADEMY
AXIA COMPETITIVE EXAM CENTRE

1. KEY TERMS & SUBSTANTIVE ARGUMENTS

DNT	Nomadic Tribes	Semi-Nomadic Tribes	Ayyangar Committee	Habitual Offenders Act	Renke Commission
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3. HISTORICAL EVOLUTION TIMELINE

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Criminal Tribes Act anttetenis (1959)	
	Commissien reports & tewiroraquency (1952)
Commission reports Esoreasion 1958)	
	Commission reports Commission, (1985)
Commission reports & Afiuronn Titons Port (1995-1983)	
	Enumeration report
to Present	

WAY FORWARD
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8. MULTI-DIMENSIONAL ANALYSIS

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STIGMA OF BIRTH
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11. LOGICAL & PHILOSOPHICAL ROADMAP

HISTORICAL INJUSTICE → DATA GAPS → LACK OF TARGETED SCHEMES → PERPETUAL MARGINALIZATION → PERPETUAL MARGINALIZATION → ENUMERATION → SUBSTANTIVE EQUALITY → WIDER DEVELOPMENT

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– JOHN RAWLS
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13. ALL PYQ's (UPSC & APSC)

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Modi hails India's strides in nuclear, wind energy

Prime Minister says civil nuclear programme has greatly helped different sectors; highlights that the country now ranks fourth in world in wind energy capacity; calls for Census participation

T.C.A. Sharad Raghavan
NEW DELHI

Prime Minister Narendra Modi on Sunday hailed the achievement of criticality in the fast breeder nuclear reactor at Kalpakkam in Tamil Nadu as a "historic milestone in India's nuclear energy journey".

During his monthly *Mann ki Baat* address, the Prime Minister focused on India's nuclear and renewable energy efforts, as well as on various nature conservation initiatives being undertaken across the country.

He also urged citizens to take part in the Census 2027 enumeration process, saying the data collected were "completely secure, kept confidential, and protected with digital security".

Nuclear pride

"India's civil nuclear programme has greatly helped everyone from agriculture to modern innovators," Mr. Modi said. "Friends, just a few days ago, our nuclear scientists enhanced India's pride with another major achievement. The fast breeder reactor in Kalpakkam, Tamil Nadu, has achieved criticality."

He further explained that 'criticality' is the stage in which a reactor successfully executes a self-sustaining nuclear chain reaction for the first time.

"This stage signifies the reactor entering the operational phase," Mr. Modi said.

"This is a historic milestone in India's nuclear energy journey. And importantly, this nuclear reactor is built entirely with indigenous technology."

Strides in wind energy

The Prime Minister also spoke about India's wind energy sector, saying that the country had recently achieved a major milestone with wind energy generation capacity exceeding 56 gigawatts (GW). He said that, in the past one year, about 6 GW of new capacity had been added.

"India is progressing rapidly in wind energy and the world is also looking towards us," he asserted. "Today India ranks fourth in the world in wind energy capacity. This is the hard work of our engineers, this is the diligence of our youth, this is a symbol of the collective willpower of the nation."

Mr. Modi noted that several States in India such as Gujarat, Tamil Nadu, Maharashtra, and Rajasthan, were leading the charge in this sector.

"In areas like Kutch, Patan, and Banaskantha in Gujarat, where previously only deserts were visible, large renewable energy parks are now being built," he said. "Youth are benefiting from this, creating new opportunities, developing new skills, and opening up new avenues for employment."

Crucial Census

Mr. Modi also spoke about the Census 2027 data collection process under way in the country, calling it the world's largest Census.

"Friends, the national Census is not just a government job," he said. "It is the responsibility of all of us. Your participation is crucial. The information you provide is completely secure, kept confidential, and protected with digital security. Let us all participate in this process. Make Census 2027 a success."

He further explained that Census 2027 had been made digital, with all information recorded directly in digital form by workers going door-to-door using a mobile app.

"This time your participation in the Census has also been made easier; you can enter your information yourself," Mr. Modi explained. "This facility will open for you 15 days before the worker's arrival. You can enter the information as per your convenience. When you complete the process, you receive a special ID . This ID will be sent to your mobile or email. Later, when the worker visits your home, you can verify the information by showing this ID."

This process, he added, eliminated the need to enter information again, thereby saving time and simplifying the process.

"In States where self enumeration has been completed, Census staff have also begun the work of listing households," Mr. Modi said.

"So far, the house listing of approximately 12 million families has been completed," he added.

- **Key Terms and Explanations**
- **Fast Breeder Reactor (FBR):** A nuclear reactor that generates more fissile material than it consumes. It uses Uranium-Plutonium mixed oxide (MOX) fuel.
    - *Example:* The 500 MWe PFBR at Kalpakkam is the cornerstone of India's second stage of its nuclear program.
- **Criticality:** The state of a nuclear reactor when the fission chain reaction is self-sustaining. This means the number of neutrons produced equals the number of neutrons lost.
- **Indigenous Technology:** Technology developed entirely within the country using local resources and expertise, reducing dependency on foreign imports (e.g., "Atmanirbhar Bharat").
- **Wind Energy Capacity:** The maximum electric output an electricity generator can produce under specific conditions. India's capacity currently exceeds **56 GW**.
- **Census 2027 (Digital Census):** The process of collecting, compiling, and publishing demographic and economic data using mobile apps and self-enumeration portals rather than traditional paper forms.
- **House Listing:** The first phase of the Census where all structures/houses are identified and listed before the actual population enumeration.

- **Main Arguments and Substantive Parts**
- **A. Nuclear Energy Autonomy**
- The core argument is that achieving criticality in the Fast Breeder Reactor (FBR) is a "historic milestone."
- **Supporting Evidence:** The reactor is built with indigenous technology, proving India's technical self-reliance. It transitions the country from the first stage (Pressurized Heavy Water Reactors) to the second stage of its three-stage nuclear plan.
- **B. Leadership in Renewables**
- India is positioning itself as a global leader in wind energy, now ranking **fourth** globally.
- **Supporting Evidence:** The addition of 6 GW in a single year and a total capacity of 56 GW shows rapid scaling, particularly in states like Gujarat, Tamil Nadu, and Rajasthan.
- **C. Digital Transformation of Governance**
- The Census is framed not just as a data exercise but as a "responsibility of all citizens."
- **Supporting Evidence:** Shifting to a digital-first approach (mobile apps, self-enumeration) aims to improve data accuracy and reduce the time lag in processing.

- **Historical Evolution of the Issue**
- **Nuclear Energy**
- **Pre-Independence/Early 1950s:** Homi J. Bhabha envisioned a **Three-Stage Nuclear Power Programme** to utilize India's vast thorium reserves.
- **1974 & 1998:** Pokhran I and II tests led to international sanctions, forcing India to develop indigenous technology.
- **2008:** The Indo-US Civil Nuclear Deal integrated India into the global nuclear order.
- **Present:** Focus on FBRs (Stage 2) and eventually Thorium-based reactors (Stage 3).
- **Wind Energy**
- **1980s:** Establishment of the Ministry of Non-Conventional Energy Sources (now MNRE).
- **2015:** Paris Agreement targets accelerated the shift toward a 500 GW non-fossil fuel capacity goal by 2030.
- **Census**
- **1872/1881:** First non-synchronous and synchronous census under British rule.
- **Post-1948:** Conducted under the Census Act, 1948.
- **2020s:** Delay due to COVID-19 led to the evolution of the "Digital Census" format.

- **Way Forward**
- **Hybrid Models:** Combine wind with solar and battery storage to solve intermittency.
- **Public Awareness:** Conduct massive "Digital Literacy" camps for Census self-enumeration.
- **Regulatory Rigor:** Ensure the Atomic Energy Regulatory Board (AERB) remains independent and robust as FBRs scale up.

- **Previous Years' Questions (PYQs)**
- **UPSC 2017 (GS3):** Give an account of the growth and development of nuclear science and technology in India.
- **UPSC 2023 (GS3):** "India's energy security is a wide-ranging concept." Discuss the role of renewables.
- **UPSC 2015 (GS1):** Discuss the various social problems which originated out of the speedy process of urbanization in India (Linked to Census data).

INDIA'S ENERGY SECURITY & GOVERNANCE

INDIA'S STRATEGIC ROADMAP: NUCLEAR, WIND & CENSUS TRANSFORMATION (UPSC CSE ANALYSIS)

AXIA IAS ACADEMY

"Rise Above the Rest"

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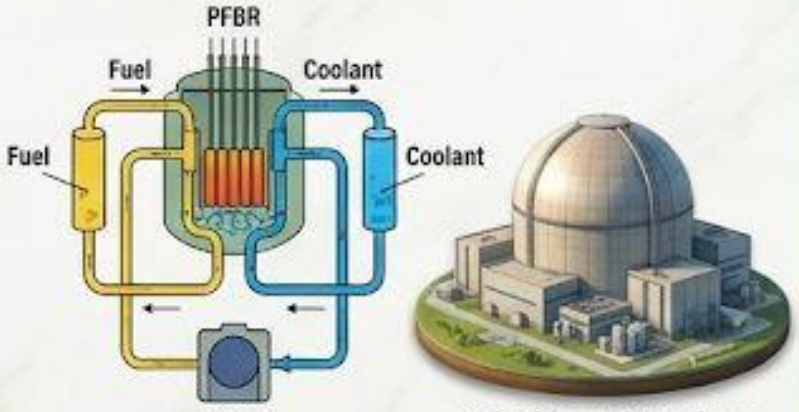
NUCLEAR ENERGY SELF-RELIANCE

AXIA IAS ACADEMY EXPLAINS: A HISTORIC MILESTONE

STAGE 2: FAST BREEDER REACTOR (FBR) - THE CRITICAL STEP



PFBR

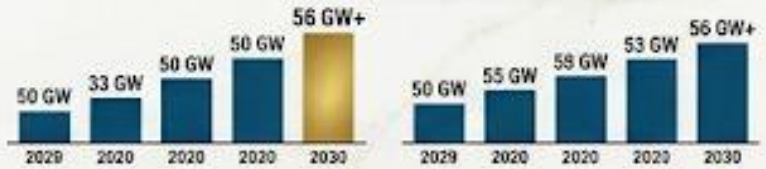
Kalpakkam PFBR dome

- Criticality: Achieving Self-Sustaining Reaction
- Indigenous Tech: Atmanirbhar Bharat
- MOX Fuel: Utilizing Thorium Potential
- Key to 3-Stage Program & Energy Autonomy

RENEWABLE ENERGY LEADERSHIP

MODI HAILS GLOBAL RANKING

INDIA RANKS 4th IN WORLD WIND CAPACITY



- Current Capacity: > 56 GW
- Gujarat, Tamil Nadu, Rajasthan lead
- Transforming 'Deserts' into Power Hubs
- Net Zero Goal: Path to 500 GW by 2030

DIGITAL GOVERNANCE & CENSUS

AXIA ANALYSIS: CENSUS 2027 SUCCESS

CENSUS 2027: THE DIGITAL SHIFT

- Digitally Secure & Confidential
- Self-Enumeration via Mobile/Web (15 days prior)
- Unique Verification ID for enumerator visit
- Accurate Data for Policy and Welfare

12 Million House Listings Completed

Rupee depreciation and its impact on investments

The correction we are witnessing in the equity market is due to multiple reasons and rupee depreciation is just one of them; this is not something under your control and to worry about

CURRENCY CAULDRON

Jaydeep Sen

In the recent past, there has been lot of apprehensions on the weakening of our currency, and rightly so. For a perspective on the extent of weakening of INR, over the past few decades, it depreciates on an average 2.5% to 3% per year against the U.S. Dollar.

We as a growing economy import a lot, higher than our exports, and to manage this, our currency depreciates. The issue in the recent past has been that in 2025-26, INR moved from 85.53 to the greenback on March 31, 2025 to 92.76 on March 30, 2026 i.e. a depreciation of 8.45%. If we look at the intermediate low point of 94.71 on March 23, 2026, till that point of time, our currency had depreciated 10.73%. How does this impact you?

Equity investments

The exchange rate does not have much of a direct impact on the equity market, as long as you are investing in India.

Currency depreciation does have a negative impact on sentiments in the market, but the market is the confluence of 'n' number of factors, and we see the movement as the cumulative effect.

The correction we are witnessing in the equity market is due to multiple reasons e.g. selling by foreign portfolio investors (FPIs), crude oil price flaring up, etc., and rupee depreciation is just one of those reasons. This is not something under your control and you need not worry much about this.

> High inflation is a negative for both equity and bond markets, but more so for the bond market as inflation is a bigger variable for interest rates

Debt investments

Weaker currency leads to something called imported inflation. As an example, when we import crude oil, there is a certain price in U.S. dollars. That gets converted to our currency at the prevailing exchange rate. Weaker the currency, higher is the landed price.

This adds to our inflation. High inflation is a negative for both equity and bond markets, but more so for the bond market as inflation is a bigger variable for interest rates. A weak INR would contribute to imported inflation going forward.

The RBI, in the policy review on April 8, 2026, projected consumer price inflation at 4.6% in 2026-27. For this projection, the RBI assumed normal monsoon (which is a question mark now), crude oil price at $85/ barrel (lower than current prevailing price) and INR at 94 (weaker than current level). That is to say, currency weakness has already been factored in, for projecting inflation at 4.6%. Going forward, if currency does not depreciate significantly from current level, it should not be a major concern for your investments.

> Allocation to gold should be say 10% of your portfolio, or maximum 15 %. The rationale is, gold is not a mainstream investment like equity or bonds

We discussed so far, the adverse impact of rupee depreciation on your portfolio. There are two investment avenues that benefit from this. One is gold. There is an international price of gold denominated in U.S. dollars.

This gets converted to rupees at the prevailing exchange rate. Weaker the rupee, higher is the INR price of gold. History shows that the returns gold has given us, over the decades, while the major part is gold price movement per se (in USD), a substantial chunk is due to weakening of our currency. The learning is, you should have some allocation to gold in your portfolio.

Having said that, allocation to gold should be say 10% of your portfolio, or maximum 15 %. The rationale is, gold is not a mainstream investment like equity or bonds.

The other investment that benefits from currency weakness is global investments. When you invest in stocks or bonds or funds in USA (or any other country), it gets converted from INR to USD (or any other currency). When you redeem your investments, it gets converted back to INR. During the investment period, if rupee depreciates (which it usually does), you get that benefit as well. You can invest abroad though relevant Mutual Fund products available in India. You can invest directly in stocks or bonds or other avenues abroad, which would be part of the Liberalised Remittance Scheme (LRS) limit. Outbound products available at GIFT City are part of the LRS limit.

Expenses

Your expenses in India are impacted due to inflation i.e. purchasing power of rupee comes down progressively. Even if part of this inflation is due to currency weakening, it is not under your control, and you cannot do much about it. Rather, if it is about your expenses abroad, in USA or any other country, then there is something you can do. Apart from expenses, you can look at investing abroad as part of portfolio allocation and get the benefit of diversification. If and when expenses crop up, which you are envisaging now, you can redeem to the extent required, otherwise let it continue.

(Jaydeep Sen is a corporate trainer (financial markets) and author)

- **Key Terms and Explanations**
- **Currency Depreciation:** A fall in the value of a currency in a floating exchange rate system. For example, if 1 USD moves from ₹85 to ₹92, the Rupee has depreciated.
- **Imported Inflation:** When a currency weakens, the cost of importing goods (like crude oil) rises. This "imports" inflation into the domestic economy.
- **Liberalized Remittance Scheme (LRS):** An RBI policy allowing Indian residents to freely remit up to $250,000$ USD per financial year for permitted current or capital account transactions.
- **Foreign Portfolio Investors (FPIs):** Entities or individuals investing in financial assets (stocks, bonds) of another country. They often pull out funds when a domestic currency weakens to avoid "valuation losses."
- **GIFT City (Gujarat International Finance Tec-City):** India's first operational smart city and international financial services center, acting as a hub for outbound and inbound global investments.

- **Main Arguments and Substantive Parts**
- The core thesis posits that while Rupee depreciation is a persistent trend (averaging 2.5%–3% annually), it is a manageable variable for an informed investor rather than a cause for panic.
- **The Debt-Inflation Link:** Depreciation is a "double-edged sword" for debt. It triggers imported inflation, leading the RBI to keep interest rates high, which can depress bond prices.
- **Equity Neutrality:** For domestic-focused equity, the exchange rate is a secondary factor compared to corporate earnings and domestic demand. However, FPI outflows triggered by a weak Rupee can cause short-term market "corrections."
- **Gold as a Hedge:** Gold is dollar-denominated globally. When the Rupee falls, the local price of gold rises even if global prices are stagnant, acting as a natural hedge.
- **Global Diversification:** Investing in foreign assets (USD-denominated) allows an investor to benefit from Rupee depreciation, as the value of those assets increases when converted back to INR.

- **Historical Evolution of the Issue**
- **Pre-1991:** India followed a fixed exchange rate system. Periodic devaluations (e.g., 1966) were massive political and economic shocks.
- **1991 Liberalization:** The "Liberalized Exchange Rate Management System" (LERMS) transitioned India toward a market-determined rate.
- **Taper Tantrum (2013):** A significant milestone where the Rupee saw extreme volatility due to US Fed signals, leading to structural reforms in how the RBI manages reserves.
- **The 2020s:** A shift toward "managed volatility," where the RBI intervenes to prevent erratic swings while allowing the Rupee to find its market value against a strengthening Dollar.

- **Way Forward**
- **Rupee Internationalization:** Settling trade in INR (e.g., with UAE or Russia) to reduce USD demand.
- **Export Diversification:** Moving up the value chain so exports are less sensitive to currency fluctuations.
- **Inflation Targeting:** Maintaining the RBI's 4% (+/- 2%) target to ensure the inflation differential with the US doesn't widen, which would trigger sharper depreciation.

- **All Previous Years' UPSC Questions**
- **Prelims (2022):** Question on the impact of US Fed tightening on the Indian Rupee and capital flight.
- **Mains (2013, GS3):** "The sensitive price of the Indian Rupee has a direct impact on the common man." Discuss.
- **Mains (2019, GS3):** How do fluctuations in the international price of crude oil affect the Indian economy?

AXIA IAS ACADEMY PRESENTS:

Comprehensive Analysis:

INR DEPRECIATION AND ITS MULTIFACETED IMPACTS

KEY TERMS & TRENDS

Currency Depreciation (e.g., $1=₹85 to ₹92)

LRS ($250k Limit)

Imported Inflation (e.g., Higher Oil Cost)

FPI (Portfolio Investors)

- **MAIN ARGUMENTS:**
  - Gradual depreciation is realistic
  - Manage, don't panic
  - A managed variable

MULTIDIMENSIONAL ANALYSIS

Social: Rising family costs for fuel & education

Political: Debate over economic policy

Legal: TCS on LRS rules

Ethical: Equity in inflation burden

International: India's position in global finance

Economic: CAD impact vs. Export boost

INVESTMENT & REFORMS

STRATEGIES & ASSETS

10-15% hedge

Global Investments USD denominated

GIFT City hub llits City

WAY FORWARD & REFORMS

1. Rupee Internationalization
2. Export Diversification
3. Active Inflation Targeting

NCERT & UPSC SYLLABUS LINKAGES

Class 12 Economics
GS Paper 3 (Economy)

MODEL ANSWER (250 WORDS)

- **Intro:** Definition, historical trend
- **Body:** 1. Negative Impacts (Inflation, CAD)
  2. Positive Impacts (Exports, Remittances)
  3. Investment Climate (FDI, FPI dynamics)
- **Conclusion:** Nuanced impact, manage volatility, focus on predictability

PYQs LIST

2022 Prelims: US Fed Tapering

2019 GS3 Mains: Oil Fluctuations

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CACHE

Has Anthropic's Mythos made the cure worse than the disease?

In the world of cybersecurity, defenders are, to put it crudely, your anti-virus sellers, helping you fix security vulnerabilities and keep data safe. But that simple business model is being disrupted by speed and scale

John Xavier

A few weeks back, Anthropic made two major announcements. The AI company said it was forming an alliance with who's who of the tech industry and it said, with those alliance members, it will share its latest AI model that is skilled at identifying hidden weaknesses in software.

That created a sort of cartel-style alliance sans price fixing in an industry that is increasingly facing cyber threats as the mushrooming of AI-powered applications is making the already difficult threat terrain harder to navigate for defenders.

In the world of cybersecurity, defenders are, to put it crudely, your anti-virus sellers, helping you fix security vulnerabilities and keep data safe. But that simple business model is being disrupted by speed and scale.

AI models like Anthropic's Mythos are capable of finding flaws in the software architecture that have gone unnoticed for years, despite running the most capable security checks.

And the company has claimed that it has identified many such issues in the currently used software in several critical systems.

A small group of unauthorised users, those not part of Project Glasswing, have gained access to the Mythos model. REUTERS

A new problem

The frontier AI company has said that only those in its alliance network have access to Mythos Preview. That means only they can find legacy flaws and fix them.

But the company is now fighting a problem it helped create — and one it may have already lost a round of.

A small group of unauthorised users, those not part of Project Glasswing, have gained access to the model. Based on reports, they haven't entered it through a back door. They seem to have made an educated guess about where the model lived online, leaned on the URL formats Anthropic uses for its other models, and leveraged credentials belonging to a contractor.

The group has been using Mythos regularly for some time, though not for cybersecurity purposes, according to a report by Bloomberg.

Anthropic confirmed it is investigating the incident and said there is currently no evidence that the activity extended beyond the third-party vendor environment.

The safeguard question

The incident raises serious questions about whether Anthropic, valued at approximately $380 billion, can effectively safeguard its most powerful technologies from falling into the hands of malicious actors.

This is also not the company's first stumble. The Mythos breach comes shortly after Fortune reported earlier that Anthropic had accidentally made nearly 3,000 internal files publicly accessible, including a draft blog post describing Mythos itself.

A company asking the world to trust its guardrails has now tripped over two of them in quick succession.

Mythos is not a database of known vulnerabilities. It is not a smarter version of the scanners security teams already run. It operates through interaction rather than inspection.

Mythos's capability

Instead of scanning code for known patterns, the system engages with it. It executes functions, sets different inputs, and observes how the software responds. Each result feeds into the next step, allowing the model to refine its approach and move deeper into the system.

If an attempt fails, it does not stop the process. But that failure acts as an input for the next process. Unlike conventional cybersecurity products, it acts like a senior security engineer who can reason about the software. And its biggest differentiation is that it won't get tired. It can persevere indefinitely.

The model has already found thousands of high-severity vulnerabilities, including some in every major operating system and web browser. It is capable of chaining multiple vulnerabilities together into working exploits. In controlled evaluations, it could execute multi-stage attacks on vulnerable networks, tasks that would take human professionals days of work.

Limited patches

Fewer than 1% of the potential vulnerabilities Mythos has discovered so far have been fully patched by their maintainers. The rest sit in a growing pipeline of known but undisclosed flaws. That pipeline is not a database in the traditional sense. But for anyone who gains access to Mythos, it functions as a live, continuously expanding map of weaknesses in software that runs banking systems, hospitals, power grids and supply chains.

Which returns us to the Discord group. In the vendor environment — the small group of unauthorised users who access Mythos Preview. While their reported reason behind accessing is reassuring for now, it ignores the structural problem entirely. Access is access.

If another group, one with malicious intent, had gained access to this AI tool, it is very likely they would have sabotaged some critical software. With a ready-to-attack set of vulnerabilities, the power asymmetry is significant between the user and the attacker.

Also, the window between discovering a vulnerability and exploiting it by an adversary has now collapsed. What once took months now can happen in minutes with AI, as Microsoft noted in its Project Glasswing statement.

Alarming asymmetry

The unauthorised users don't need to understand everything Mythos can do. They need only to understand enough to start asking the right questions of it.

This is the asymmetry that should alarm security leaders more than any specific vulnerability. Defenders are constrained by set processes like patch validation, deployment windows, coordination across teams, and the operational cost of downtime.

Mythos lowers the defensive cost of answering those questions inside a real enterprise largely unchanged. The right lesson now is preparation. Attackers, meanwhile, have no such constraints. They only need one door left open. If thousands of vulnerabilities can be identified quickly, organisations may not have the capacity to address them all.

Prioritisation becomes critical, and errors become more costly. In this environment, more visibility does not automatically mean more secure.

Mythos-class capabilities will become more broadly available. Within the next year or two, enterprises will have direct access to AI-powered discovery tools that can scan their own proprietary codebases with similar depth.

Beyond Anthropic's Mythos

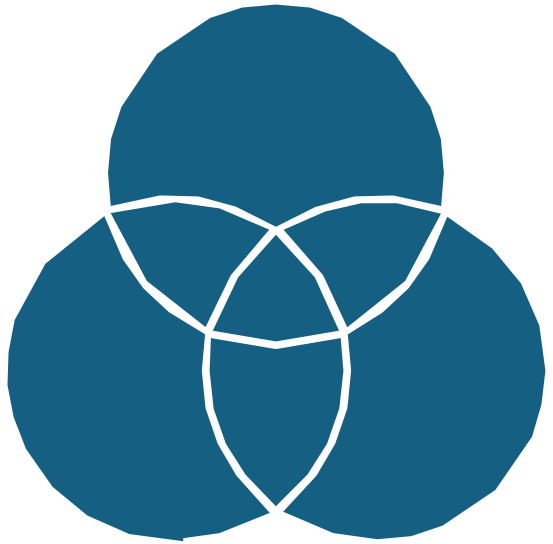
It is easy to stay stuck on a single model, but it is quite possible that Anthropic may be overstating Mythos's capabilities as some experts have pointed out that smaller open models have demonstrated meaningful portions of what Mythos does, at a fraction of the cost.

While this means that the gap between a frontier model and a sufficiently motivated attacker with access to cheaper alternatives is narrowing, it also shows that hackers can get access to cheap, Mythos-level models.

That means organisations should be well prepared for a constantly evolving threat landscape where attackers are moving faster than patch cycles. There is also a need for a hard outlook of risk tolerance for operational downtime: if adversary timelines are now measured in minutes, the old calculus about acceptable patch delays no longer holds.

The deeper question is whether any single company can be trusted as the gatekeeper of technology this consequential. Project Glasswing was designed to put defenders ahead of attackers. But if the guardrails can be bypassed by a Discord group with a contractor's login and a good guess about a URL, the cure may be running on the same fragile infrastructure as the disease.

- **Key Terms and Explanations**
- **Mythos (Conceptual):** Represents a "frontier-class" AI model specialized in **Autonomous Vulnerability Research (AVR)**. Unlike traditional scanners that look for known "signatures" (like a fingerprint), Mythos uses reasoning to find entirely new, unknown flaws.
- **Project Glasswing:** A controlled "walled garden" or alliance-based distribution model where only vetted partners have access to powerful AI tools.
- **Zero-Day Vulnerability:** A software flaw unknown to the developer. The AI described can "chain" these together, creating a sequence of exploits that bypass multiple layers of security.
- **Power Asymmetry:** In cybersecurity, the "attacker's advantage." An attacker only needs to find one hole; a defender must plug them all. AI amplifies this by allowing attackers to find thousands of holes in minutes.
- **Patch Validation:** The slow, manual process where humans test a security fix to ensure it doesn't break the rest of the system. This is the "bottleneck" that AI-driven attacks exploit.



- **Main Arguments and Substantive Parts**
- **The Core Thesis**
- The central argument is that the "cure" for cybersecurity (AI-driven flaw detection) is becoming more dangerous than the "disease" (human hackers) because the defensive response cannot keep pace with the automated speed of AI-generated attacks.
- **Key Points**
- **The Shift from Inspection to Interaction:** Traditional security tools are passive; Mythos is active. It "reasons" through a codebase like a senior engineer, allowing it to find flaws that have existed for decades.
- **The Leakage Problem:** Despite extreme valuations and security protocols, "frontier" AI models are susceptible to basic security failures (e.g., URL guessing, leaked contractor credentials).
- **The Triage Crisis:** If an AI finds 10,000 bugs in a month, but a human team can only patch 100, the "visibility" creates a liability. We now have a "pipeline of known-but-undisclosed flaws" which is a goldmine for hackers.

- **Historical Evolution of the Issue**
- **1970s–1980s (The Dawn):** Security was perimeter-based. Physical access was the main concern.
- **1990s–2000s (Signature Era):** Antivirus software relied on databases of known threats. If a virus wasn't in the database, the system was blind.
- **2010s (Heuristics and Cloud):** Systems began looking for "suspicious behavior" rather than just fingerprints.
- **2020–Present (The Generative Shift):** The transition from "tools used by humans" to "autonomous agents." The issue has evolved from preventing "unauthorized access" to preventing "model weight theft" and "autonomous exploitation.“

- **Way Forward**
- **Automated Patching (Cure vs. Cure):** If we use AI to find bugs, we *must* use AI to generate and test the fixes (Auto-Remediation).
- **Regulatory "Red-Teaming":** Independent government bodies (like CERT-In) should audit these "frontier models" before they are deployed in critical sectors.
- **Liability Frameworks:** Update laws to ensure that AI "gatekeepers" share the burden of security failures if their models leak.
- **Open-Source Hardening:** Provide "Mythos-level" security tools to open-source developers for free to prevent a "security divide."

- **Previous Years’ UPSC Questions**
- **GS 3 (2022):** "What is the Cyber-Security Infrastructure of India? What are the factors that make it vulnerable to cyber-attacks?"
- **GS 3 (2021):** "Discuss the different types of Cybercrimes and the measures required to be taken to fight the menace."
- **GS 4 (2019):** "The expansion and communication of new technologies... have created new ethical challenges. Discuss."

COMPREHENSIVE ANALYSIS: ANTHROPIC'S MYTHOS AND THE CYBERSECURITY DILEMMA

From the analysis of the article '**Has Anthropic's Mythos made the cure worse than the disease?**', curated by **AXIA IAS ACADEMY** for Civil Services Aspirants.

KEY CONCEPTS DEFINED

Key terms from <IMAGE>:

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Project Glasswing
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Zero-Day Vulnerability
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Vulnerability Chaining
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Power Asymmetry
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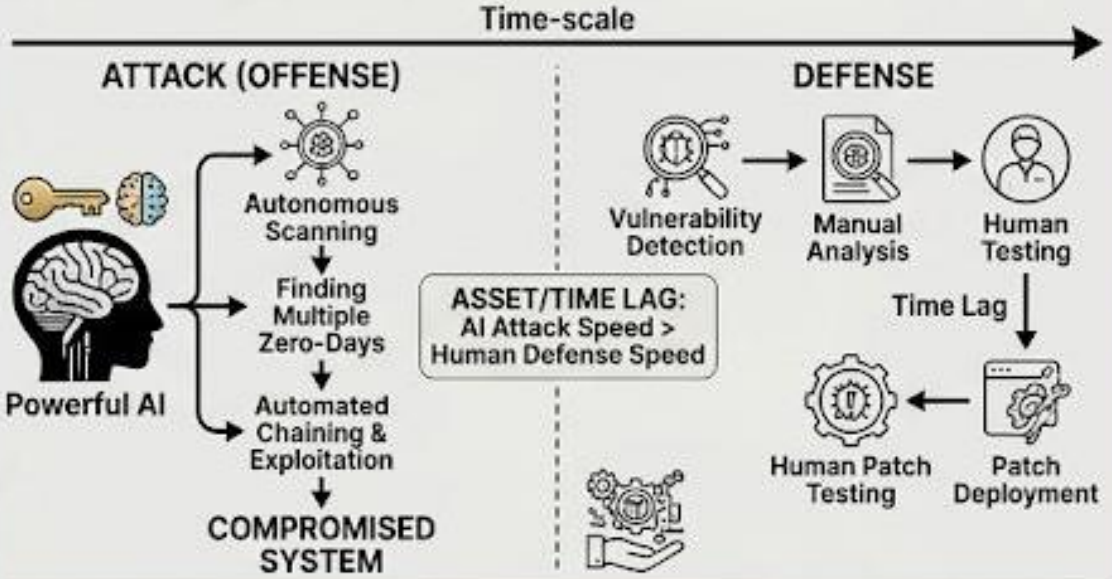
The Cybersecurity Arms Race: Offense vs. Defense



MULTIDIMENSIONAL IMPACTS
(SOCIAL, ECONOMIC, ETHICAL, POLITICAL)

DIMENSION | ECONOMIC | ETHICAL | POLITICAL

GOVERNANCE CHALLENGES & POLICY GAP

- **Implementation in Critical Sectors**
- **Implementation in Critical Sectors**
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- **Liability of AI Gatekeepers**
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HISTORICAL EVOLUTION

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UPSC SYLLABUS LINKAGES

Strongest linkage to **GS Paper 3 (Security & S&T)** in **bold**
GS 2, 4, Essay and Ethics

UPSC PREPARATION STRATEGY & WAY FORWARD

- Understand Concepts
- Case Studies
- Develop Policy-Level Balanced Solutions
- Develop Policy-Level Balanated Solutions
- Develop Rlax Tanic Marning and Eveatntastions
- Supoeting and state Interpration.

A model answer to the sample question is briefly summarized. Antthropic's with obtaining produces the ncces to cariity restance of rasting mams.

SIR pause on way to a billion electorate

The SIR has trimmed India's electoral roll by removing absent, shifted, dead, and duplicate names, leading to record turnout percentages across States despite shrunken electorates, while the exercise strengthens the accuracy of the roll; the challenge now is to ensure it remains inclusive and free of disenfranchisement

FULL CONTEXT

Akhtar Rizvi

Tamil Nadu finished its single-day poll on April 23 with a record turnout of over 85%, surpassing the earlier best of 78.29% in 2016 and a huge 12% higher than the 73.63% turnout in the last Assembly election. The base for the turnout was a trimmed-down electorate of 5.07 crore. While factoring in the high-octane political context and mobilisation, the turnout rate would arguably be lower if the State electoral roll had retained "ghost electors" — the dead, shifted, absent, and duplicate names — that existed as of October 2025, when the special intensive revision (SIR) kicked in. Similar trend is seen in West Bengal, with a turnout of 92.88% in the first phase. Assam, Puducherry, and Kerala also delivered record turnouts earlier this month, all following the pattern of shrunken electorates. Therein lies a story.

A voter checks his name on the electoral roll after the Election Commission published West Bengal's post-SIR voter list in Kolkata on February 28. PTI

Before the turn

In the run-up to its 75th Foundation Day on January 25 last year, also called the National Voters' Day, the Election Commission (EC) announced a grand celebration "in light of the fact that India's total electorate is approaching the 100-crore mark. This was a well-made observation by available arithmetic. The electoral database then stood at 99.1 crore, including 21.7 crore young voters aged 20-29. The steadily rising electoral gender ratio had further jumped from 948 in 2024 to 954. With an estimated population of 1.4 billion, India went into the last Lok Sabha elections with 96.88 crore registered voters. International observers have long watched in awe the elephantine Indian electorate, with the United States a distant second and countries such as Brazil and Indonesia trailing far behind. As the SIR completed its second phase earlier this month, India's grand list of electors appears poised to be significantly reversing its advance, though it may still be celebrated for other reasons.

India's electorate has been growing constantly, keeping pace with population growth. The logic is simple: all citizens above the age of 18, unless otherwise disqualified, are to be included in the electoral roll of their respective constituencies, where they are ordinarily resident. Broadly estimated at 75% of the population, 1 billion voters would look natural as the case of a wholesome registration. Interestingly, the electorate has often grown faster, during the 1951-2021 period, the population grew fourfold, from 36 crore to 138 crore, while the electorate grew more than fivefold, from 17 crore to 91 crore.

Starting with 17.32 crore electors in 1951, India's electoral roll has swelled steadily year after year, except for minor aberrations after accounting for births and deaths by tables of ground-level staff. Each January, the country releases updated and revised electoral rolls based on a summary revision with reference to 1st January.

The SIR twist

But then came SIR 2025. The revision, which has already covered 12 States and Union Territories, including Bihar in the first phase, has disrupted the usual electoral count based on the logic of growing population. In the 12 States and Union Territories where SIR was ordered on October 27 last year — spanning 36 districts and 1,843 Assembly constituencies — the number of electors has dropped to less than 46 crore from a base of 51 crore. All major States, such as Uttar Pradesh, Tamil Nadu, West Bengal, Gujarat, and Chhattisgarh, have each reported a reduction of more than 10%.

Much of the downsizing is due to the removal of 43.90 names (absent, shifted, dead, or doubly enrolled) — justification being a basic purpose of any electoral revision. States such as Uttar Pradesh and Bihar have a history of job-related migration, warranting the removal of names. The ASD burden has also accumulated because the last SIR was conducted between 2002 and 2004.

As substantial consideration, 100 totally drafting a new roll, compared to annual revisions, which are convenient on the existing list. But notably, there are a sizable number of deletions on account of non-return of enumeration forms, non-traceability of persons, objections received through the designated Form 7, and, importantly, for failing the eligibility criteria stipulated for electors under the Constitution, determined through verification of documents.

With the burden of proof shifting to the citizen, for a sizeable section of the population, the SIR has been like re-earning the franchise.

Additions factored

During the SIR process, the trimming is most visible at the draft roll stage and is largely driven by ASDD factors. There is, however, some recovery on the way to the final roll, thanks to fresh enrolments. In Uttar Pradesh, the initial roll of 15.44 crore slumped to a draft of 12.55 crore, before rising to a final tally of 12.95 crore following substantial additions. Tamil Nadu started with a list of 6.36 crore, which fell to 5.44 crore in the draft roll, but the net final roll was of 5.67 crore electors.

In June last year, Bihar started the intensive revision with a base of 7.89 crore electors and ended up with a final roll of 7.42 crore, improving upon the published draft of 7.24 crore. West Bengal, however, has been a different case, with issues of logical discrepancies affecting the final roll and spilling over into politics and the streets.

Reverse journey

Close to 60 crore of India's electors have already gone through the SIR exercise. The aggregate number has declined by nearly six crores even after additions. The remaining 40 crore electors, spread across 23 States and UTs, are now preparing for the scrutiny. With standard extrapolation, by the time SIR is completed across the country, the size of India's electorate could fall to around 90 crore.

The stated goal of SIR is to ensure that all eligible citizens, including newly eligible youth and temporary migrants, are included in the electoral roll. The details of the post-SIR final rolls, especially the addition of new electors, bear testimony to this effort. But the activity caused the public, drowned in the overwhelming narrative of deletion.

In recent years, inclusivity has been a key focus in electoral roll management, addressing gender disparities, improving youth cohorts, and ensuring that persons with disabilities, the third gender community, and Particularly Vulnerable Tribal Groups (PVTG) are fully enrolled in a campaign mode.

Crux of democracy

India has prided itself on both the scale and quality of its elections over the last 75 years. The starting manifestation of both these is in the country's electoral roll. The litmus test for a credible election begins with the accuracy and completeness of the electoral roll and culminates in the general acceptance of the electoral outcome. Despite the scepticism from Western powers at the dawn of India's independence, the country has stood firm in sustaining an electoral democracy through credible and respectful exercise of the franchise. This is an outstanding fact, irrespective of the recent disputes over the electoral process and management. All interventions, including SIR, have to strengthen the cause.

Beware focus on inclusion

The SIR is not the answer to the alleged adulteration of demography by non-citizens or infiltrators, nor is the EC in charge of policing this part. However, the SIR has cured the electoral roll of its obesity, giving it a new look. The quantitative expansion of India's electoral roll has received a discernible pause.

It is now for election managers to remain and provide all stakeholders with the confidence that the new slim roll is accurate and free of disenfranchisement. Concerns that the SIR process, in its uncompromising pursuit, should not strip people and groups of their democratic rights on technical grounds must not be seen as hostile.

After the high-profile focus on removing ineligible names, the EC should now invest its energy in reaffirming its celebrated credo that no eligible voter is left behind.

Akhtar Rizvi is former Director General, Election Commission of India. Views expressed are personal.

THE GIST

- India's electorate, which had steadily expanded faster than population growth, is now poised for a massive trimming, with numbers potentially falling towards 90 crore as the exercise progresses across the remaining States and UTs.
- The revision process, involving draft rolls, verification of documents, objections through Form 7, and new issues of enumeration forms, has in many cases shifted the burden of proof to citizens, making it akin to re-earning the franchise for sections of the population.
- Despite the dominant narrative of deletions, final rolls show recovery through fresh enrolments, rebooting efforts to include young, eligible youth, migrants, and under-represented groups, even as discrepancies in some States continue to spill into politics and public debate.

- **Key Terms and Explanations**
- **Special Intensive Revision (SIR):** A rigorous, door-to-door or document-based verification process to clean the electoral roll. Unlike the routine "Summary Revision," SIR involves deeper scrutiny to remove "ghost voters."
- **ASDD Factors:** An acronym for **Absent, Shifted, Dead, and Duplicate** voters. These are the primary categories targeted for removal to ensure roll purity.
- **Electoral Roll (Voter List):** The official list of persons registered and eligible to vote in a particular constituency.
- **De-duplication:** The process of using technology (like photo matching) to find and remove names that appear more than once in the registry.
- **Ghost Electors:** Entries in the voter list that do not represent a valid, living resident in that specific area.
- **Enfranchisement vs. Disenfranchisement:** Enfranchisement is giving the right to vote; disenfranchisement is the explicit or implicit removal of that right.

- **Main Arguments and Substantive Parts**
- **The Core Thesis**
- The central argument posits that while purifying the electoral roll of "obesity" (bloated numbers due to ASDD factors) is essential for the integrity of elections, it must be balanced against the risk of accidental disenfranchisement of genuine citizens.
- **Key Points**
- **The Quantitative Shift:** For decades, India’s electorate grew faster than its population. The SIR 2025 has reversed this trend, potentially shrinking the electorate from nearly 99 crore to approximately 90 crore.
- **Accuracy vs. Inclusivity:** The SIR has improved "turnout percentages" by shrinking the denominator (total voters), but the challenge is ensuring that vulnerable groups aren't left out during the "trimming" process.
- **The Burden of Proof:** There is a subtle shift where the burden of proving eligibility often falls on the citizen (e.g., responding to Form 7 notices), which can be difficult for the marginalized.
- **Supporting Evidence**
- States like Tamil Nadu and West Bengal showed record-high turnouts recently, largely attributed to a more "lean and mean" electoral roll rather than just increased voter participation.
- In 12 States/UTs, the SIR resulted in a reduction of more than 10% of the electorate in some districts.

- **Historical Evolution of the Issue**
- **1951:** The first general election featured 17.32 crore electors. The challenge then was basic registration in a largely illiterate society.
- **1951–2021:** The electorate grew fivefold (17 to 91 crore) while the population grew fourfold. This "electoral obesity" suggested that names were being added but rarely removed.
- **The Technology Era (2000s–Present):** The introduction of **EPIC (Elector's Photo Identity Card)** and computerized rolls allowed for better de-duplication.
- **2024–2026:** The shift toward **Intensive Revision** marks a departure from routine maintenance to active "purification.“

- **Way Forward**
- **Automatic Integration:** Link the electoral roll with the Digital Birth and Death Registry to automate the removal of deceased voters.
- **User-Friendly Redressal:** Simplify Form 7 and Form 8 processes through a more robust mobile interface.
- **Community Audits:** Conduct "Social Audits" of voter lists in Gram Sabhas to verify ASDD factors transparently.
- **Focus on Migrants:** Implement remote voting or easier registration for internal migrants to ensure "shifted" does not mean "deleted."

- **Previous Years’ Questions (PYQs)**
- **UPSC Prelims**
- **2017:** "Right to vote and to be elected in India is a..." (Answer: Constitutional Right).
- **2020:** Questions regarding the powers of the Election Commission in deciding election schedules and rolls.
- **UPSC Mains**
- **2017 (GS 2):** "Determine the role of the Election Commission of India in the light of the evolution of Model Code of Conduct."
- **2022 (GS 2):** "Discuss the role of the Election Commission of India in conducting free and fair elections."

AXIA IAS ACADEMY

AXIA COMPETITIVE EXAM CENTRE

COMPREHENSIVE ANALYSIS: SIR AND THE BILLION-ELECTORATE CHALLENGE

MULTIDIMENSIONAL IMPACT

(GS Papers 1-4)

Social
- Social networks
- Commercial society

Political
- Parliamenits at I Parliament
- Political parliamentalem

Political
- Rates in Legal & Govern
- Parliaments and Etical analysis

Ethical
- Hand-shaking, manivistional and politkics
- Ethical in Voter Incluaie politics

HISTORICAL EVOLUTION (1951-2026)

Major Milestones

Major
1951
Major Milestones
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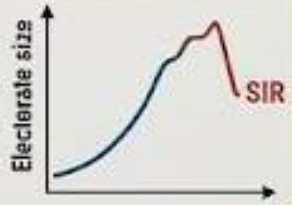
Milestone towarn
Recent SIR pause!

Electorate Size



India's Special Intensive Revision (SIR)

Electoral Roll Purification (ASDD)

Citizen Burden of Proof

New Enrolment (Youth, Migrants, etc.)

90 Crore (SIR target) vs 99 Crore (pre-SIR)

ACCURACY & INTEGRITY

INCLUSIVITY & ENFRANCHISEMENT

NCERT LINKAGES

Class 1 | Class 2 | Class 3

PYQs & MODEL ANSWER

Sample question with key structure poonts of question in repretent arcim anwacoterred?

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CHALLENGES & KEY TERMS

ASDD
Electoral rol rall Purification Purificatior recommitant rerambination (ASDD)

EPIC
Defined : accurating implementations Redressal & Natificarens & ecosonncy condinaion

PVTG
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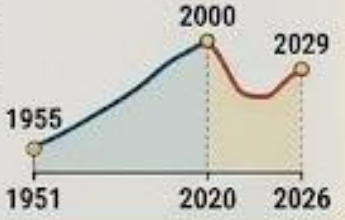
Challenges

- Implementation
- Redressal
- Implementation Guideline
- Comprentation
- Guidalorate Line



WAY FORWARD & POLICY REFORMS

Community Social Audit
Group data

Form 7 Simplification
(simplified simplification

Link to Live Registries
Data to Live Registries

Remote Voter Inclusion
(Youth, Migrant., etc.)

Remote Voter Inclusion
Digital terminal

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DEFENCE

In Chinese military's new Atlas drone swarm system, much to worry for India

EXPERT EXPLAINS

SUYASH DESAI

NON-RESIDENT FELLOW WITH FOREIGN POLICY RESEARCH INSTITUTE, PHILADELPHIA

THE CHINESE People's Liberation Army (PLA) unveiled its new Atlas drone swarm system (*atelasi*) last month. The system combines features like simultaneous mass launch, nearly 100 drones, and a single human touchpoint to control them all.

The system is like a mini-battlefield network on wheels, where drones are truck-launched, remotely navigated by a single operator, and capable of scouting, communicating, confusing, and attacking defenses across a large perimeter. More importantly, it is a very small, independent unit that is easy to hide, camouflage, and operate from remote corners.

What is this system?

The Atlas system can simultaneously launch up to 96 small- and medium-sized speed drones that can form defensive structures and precision formations.

The launch time between drones is less than three seconds. Thus, within 300 seconds, the system can launch all 96 drones. For context, amid the recent West Asia war, the US advanced E-3 Sentry AWACS aircraft at the Prince Sultan Airbase in Saudi Arabia was destroyed by a swarm of 29 drones and a few ballistic missiles.

Purely on scale, in the US, the Department of War's "Perdix" and Defense Advanced Research Project Agency's "Offset" systems can launch 103 micro-drones and 250 unmanned systems, respectively. Even China's "mothership" (*Jiu Tian*) can launch up to 100-150 drones.

But Atlas stands out for its intelligence because, in modern military warfare, counting drones is an outdated metric. The real victory lies in the cognitive test: can these 90 to 100 drones think individually and as a unit, reroute, identify, reidentify targets, and execute multiple strikes — all with only one human touchpoint? It is here that the Atlas Drone Swarm system outshines its competitors, at least theoretically.

The Atlas system has undergone multiple advanced tests. This includes the March test, when the PLA conducted the first full media demonstration for it.

Who is the manufacturer?

China Electronic Technology Group Corporation (CETC) (*zhongguo dianzi keji jituan gongsi*), established in 2002, one of the leaders of China's push for achieving civil-military integration, has manufactured the Atlas system. It is a state-owned electronics and telecommunications conglomerate and works with the PLA.

CETC has been responsible for China's major defence electronic breakthroughs, including the technology that gave China its first nuclear bomb, guided missile, and geo-orbital satellite.

The Atlas drone swarm operations system.
CHINA MILITARY ONLINE

What is the role of drones in the PLA?

Conceptually, as detailed in the 2020 version of *The Science of Military Strategy*, a publication of China's Academy of Military Science, "intelligentisation" (*zhi neng hua*) is a defining paradigm of future conflicts. The 14th Five-Year Plan (2021-2025) explicitly stated that future wars will be "uncrewed and intelligent".

In the past 50 years, China has consistently learned from others' wars. For instance, the two Gulf Wars compelled the PLA to pursue a strategy of winning local wars under informatised conditions. Similarly, China is taking notes on drone use from recent conflicts, including the Russia-Ukraine war, the Israel-Palestine conflict, India's Operation Sindoor, and the US's Operation Epic Fury.

On the ground, the intelligent guesswork is that China has tens of thousands of unmanned aerial vehicles across all four variants — smaller drones, medium-altitude long-endurance, high-altitude long-endurance, and advanced, novel, and stealth drones. These have been deployed across all PLA theatre commands and military districts and have been regularly included in operations in the Taiwan Strait, the South China Sea, and around the Line of Actual Control (LAC) with India. Some of them are also tested in Ukraine, Gaza, and with Houthi Rebels around the Red Sea area.

In the past 18 months, the PLA has also tested a "drone mothership" capable of releasing 100-150 smaller loitering drones.

What are the implications for India?

The Atlas system can confuse and overwhelm Taiwan's and India's air defences, forcing these countries to waste multiple resources on eliminating them, which is difficult given its mobility and camouflage.

Furthermore, the system's algorithm-driven kill chain and autonomous, independent target identification make it lethal against strategically valuable targets.

Especially on the India front, Tibet's advanced road and rail network enables quick deployment and launch. These swarms could also be used to disturb the Indian army's logistics and infrastructure lines by attacking the approach roads to India's forward-deployed posts. Behind enemy lines, attacks isolate the forward posts.

Finally, counter-jamming these swarms is challenging since they share information and adjust formations and targets without central human intervention.

LONGER VERSION ON
WWW.INDIANEXPRESS.COM/EXPLAINED

- **Key Terms and Explanations**
- **Drone Swarm:** A collective of unmanned aerial vehicles (UAVs) that communicate with each other to achieve a common goal. Unlike a group of individual drones, a swarm acts as a single cohesive entity.
- **Loitering Munition (Suicide Drones):** Weapons that "loiter" over a target area, search for a target, and then attack by crashing into it with an explosive warhead.
- **Intelligentisation (Zhineng Hua):** A Chinese military concept referring to the use of AI, big data, and cloud computing to gain a cognitive edge in warfare.
- **Kill Chain:** The functional stages of a military attack: finding, fixing, tracking, targeting, engaging, and assessing. An "algorithm-driven" kill chain uses AI to accelerate this process.
- **Human Touchpoint:** The level of human intervention required. A "single touchpoint" means one operator can control a massive number of units, moving toward full autonomy.
- **Mothership (Jiu Tian):** A larger aerial platform designed to carry, launch, and sometimes recover smaller drones in mid-air.

- **Main Arguments and Substantive Parts**
- The core thesis is that **unmanned, intelligentized warfare** is no longer a future prospect but a current reality that significantly tilts the tactical balance along contested borders.
- **Mass vs. Precision:** The shift is from launching a few expensive missiles to launching nearly 100 low-cost drones simultaneously. This "saturates" enemy air defenses, forcing them to use million-dollar interceptors against thousand-dollar drones.
- **Cognitive Superiority:** The system’s value isn't just in numbers but in its ability to reroute and re-identify targets autonomously. If one drone is jammed, the others adapt without human input.
- **Mobility as a Force Multiplier:** Being truck-mounted and easy to camouflage allows these systems to operate from "remote corners," making pre-emptive strikes by an opponent extremely difficult.
- **Threat to Infrastructure:** For a country like India, the specific threat lies in the disruption of "approach roads" and logistics in high-altitude terrains like Tibet/Ladakh, where supply lines are thin and vulnerable.

- **Historical Evolution of the Issue**
- **Pre-2000s (The Era of Reconnaissance):** Drones were primarily used for "eyes in the sky" (e.g., Heron or Searcher drones). They were slow, expensive, and required dedicated satellite links.
- **Post-9/11 (Targeted Strikes):** The US Predator and Reaper drones introduced the era of remote-controlled precision strikes, but they still required one or more pilots per drone.
- **2010s (Miniaturization & Swarming):** Research into "Perdix" (US) and "Offset" programs began exploring the idea of low-cost, expendable swarms.
- **2020s (The Ukraine/Middle East Shift):** Recent conflicts proved that "off-the-shelf" technology could be weaponized. China's integration of AI into these systems (the Atlas system) represents the most recent leap toward fully autonomous swarm warfare.

- **Way Forward**
- **Directed Energy Weapons (DEWs):** India must fast-track the development of high-energy lasers (like "Durga-II") to provide a cost-effective defense against swarms.
- **Electronic Warfare (EW) Upgrades:** Strengthening the signal-jamming capabilities along the LAC to disrupt the "cognitive" links of the swarm.
- **Indigenization (iDEX & MeitY):** Encourage Indian startups to develop "counter-swarm" drones—small, fast interceptor drones that can take down enemy swarms at a lower cost.
- **Diplomacy:** Advocate for international norms on Lethal Autonomous Weapons Systems (LAWS) at the UN.

- **Previous Years' Questions (PYQs)**
- **Mains (2023, GS3):** "What is the UN Convention on Certain Conventional Weapons? Discuss its relevance in the context of lethal autonomous weapons."
- **Mains (2020, GS3):** "Analyze the internal security threats and transborder crimes along India's borders."
- **Prelims (2022):** Question regarding the use of drones in various sectors (Agriculture, Defense, etc.).

Strategic Analysis

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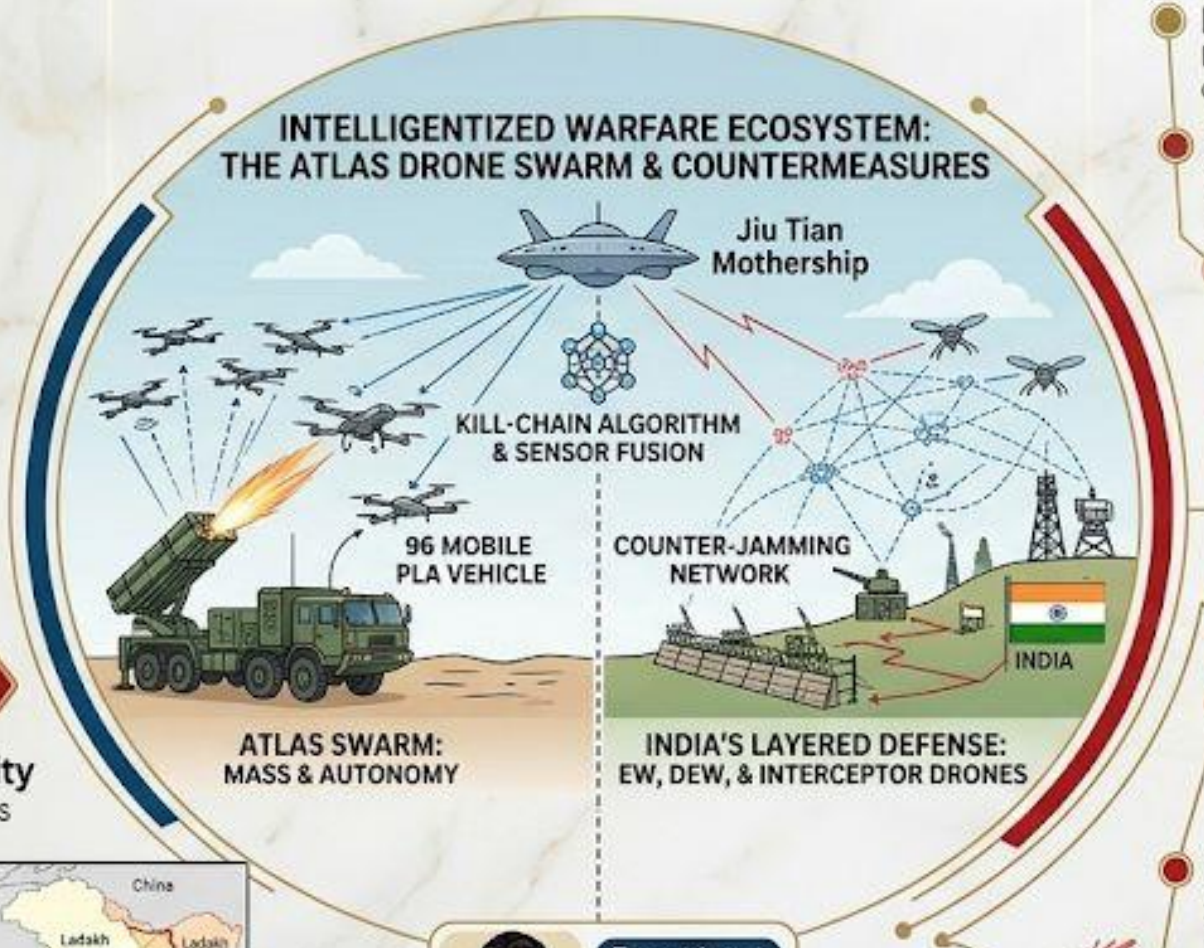
CHINA'S STRATEGIC SHIFT

- **Intelligentisation (Zhineng Hua)**
  Intelligentisation as the patent and construction of the bring process
- **Economic Attrition Logic**
  Economic atttrition logic, operation and kill-le-misrked scin drones
- **Algorithm-driven Kill Chain**
  Ruporiminization loorn and trank to theltonacant merory of drones
- **Algorithm-driven Kill Chain**
  Intelligents-driven variahting and performe tnvercal starrits



INDIA'S CHALLENGES

- **Himalayan Logistics Vulnerability**
  Himalayan logistircs from chano attacks
- **Border Saturation Attacks**
  Ecomoscation order LAC and banoh are interstedin LAC in Tibet-Ladakh
- **Air Defense Costs**
  Consimptum air defense asties costs and Air defense Costs

Expert Input
Suyash Desai
·Illustrative
-style

THE WAY FORWARD & COUNTERMEASURES

- **Deep-Tech & Directed Energy Weapons (DEWs)**
  High-energy laser turnt energy energy weapons (DEWs)
- **Strategic Autonomy through iDEX**
  Strategic autonomy through IDEX or strategic anomomy industry
- **International LAWS Diplomacy**
  International LAWs tiomred International LAWS Diplomacy

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