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Daily News Analysis

The Hindu Important News Articles & Editorial For UPSC CSE

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Page 01: GS 3 : Disaster Management

On May 24, 2025, the container ship MSC Elsa 3 sank 14.6 nautical miles off the Kochi coast after encountering extreme weather. The Kerala government has officially declared this incident a "State-specific disaster" due to its serious implications on the coastal ecosystem, economy, and public safety.

Kerala government declares Kochi shipwreck a State disaster

The Hindu Bureau
THIRUVANANTHAPURAM

The Kerala government has declared the shipwreck that occurred 14.6 nautical miles off its coast on May 24 a "State-specific disaster".

Tinku Biswal, Principal Secretary of the State Disaster Management department, stated that the shipwreck off Kochi posed a potentially serious threat to Kerala's coast, environmentally, socially, and economically.

Ms. Biswal stated in the government order that the incident had raised serious concerns, including the potential for oil spills and drifting of debris, such as cargo containers, in the littoral waters abutting Kerala's coastline.

The order permits the State Disaster Management Authority to mobilise resources, including personnel and significant sums of money from the State Disaster Response Fund (SDRF), for relief efforts.

MSC Elsa 3, which had set sail for Kochi from Vizhinjam, foundered after encountering extreme weather.

640 containers

A perilous combination of heavy seas, possible hull leakage, mechanical failure and perhaps unbalanced cargo reportedly caused the ship to list heavily and sink. The Coast Guard rescued the ship's crew, comprising 21 individuals.

Floating threat: A shipping container found washed ashore between Kodimunai and Vaniyakudi along the Tamil Nadu coastline on Thursday. SPECIAL ARRANGEMENT

The Customs department verified the ship's cargo manifesto.

It said the sunken vessel threw 640 containers, including 12 containing hazardous incendiary material, overboard when it flipped over. Thus far, at least 54 containers have washed ashore on the beaches of Kollam (43), Thiruvananthapuram (9), and Alappuzha (2).

Meanwhile, Revenue Minister K. Rajan said a emergency response ship from Puducherry had set sail for the sunken ship.

He further said a marine disaster management team had cordoned off waters near the shipwreck site with floating booms to prevent oil slicks from spreading.

The Indian National Centre for Ocean Information (INCOIS) has mapped areas where weathered pieces of oil from a ship, known as "tar balls or petroleum blobs", could wash up along Kerala's coastline.

In South T.N.

Meanwhile, a container from the sunken Liberian ship washed ashore between Kodimunai and Vaniyakudi in Tamil Nadu's Colachel on Thursday, a day after several bags of tiny plastic pellets from the ship were found along the shores of coastal villages in the western part of Kanniyakumari district.

Since Wednesday, containers from the ship are drifting towards Kanniyakumari due to ocean currents and monsoon winds.

Kanniyakumari District Collector R. Alagumeena told *The Hindu*, "An expert team from the shipping company in Gujarat is on its way to recover the item from the shore." Revenue and police officials are providing security to the container.

EDITORIAL
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Why is it Significant?

- **Environmental Threat:**The ship carried 640 containers, including 12 with hazardous incendiary materials. Oil spills, drifting debris, and the formation of tar balls threaten the fragile marine ecosystem.
- **Public Health & Safety Concerns:**Washed ashore containers and tiny plastic pellets can harm coastal communities through toxic exposure, contamination, and microplastic pollution.
- **Economic Impact:**Coastal fishing communities are at risk. Tourism and port operations may also be disrupted.
- **Administrative Response:**Kerala invoked provisions under the State Disaster Response Fund (SDRF) to mobilize funds and personnel. Floating booms were deployed to prevent oil slick spread.

Wider Implications:

1. **Maritime Infrastructure Gaps:**
    - Raises concerns over the adequacy of safety checks, cargo balance protocols, and weather preparedness in Indian shipping.
2. **Disaster Preparedness:**

- Need for robust Marine Disaster Management Plans under the NDMA framework.
- Coordination between states (Kerala and Tamil Nadu) and central agencies (INCOIS, Coast Guard) highlights gaps and strengths in inter-agency collaboration.

3. **Environmental Governance:**
   - Long-term pollution from hazardous cargo and microplastics underscores the importance of stricter environmental clearances for marine transport.
4. **Legal and International Aspects:**
   - The ship was Liberian-flagged, invoking issues under International Maritime Law and India's rights/responsibilities in its Exclusive Economic Zone (EEZ).

Way Forward:

- Comprehensive Audit of Cargo Ships passing through Indian waters.
- Strict adherence to IMO protocols for hazardous materials.
- Permanent marine surveillance and cleanup teams along high-risk zones.
- Development of a marine environmental compensation framework to hold operators accountable.
- Public awareness and coastal community participation in disaster response planning.

Conclusion:

The Kochi shipwreck is a wake-up call for India's maritime disaster preparedness. It brings into sharp focus the intersection of environment, economy, and governance. Proactive planning, inter-state coordination, and international cooperation are key to mitigating such maritime disasters in the future.

UPSC Mains Practice Question

Ques : Maritime accidents pose a multidimensional threat to India's environmental and economic security. Discuss with reference to the MSC Elsa 3 incident.**(150 words)**

Page 03: GS 2: Governance

A section of the six-lane National Highway-66 (NH-66) collapsed near Kooriyad in Malappuram district, Kerala, raising serious concerns about infrastructure quality and public safety. In response, the Parliamentary Public Accounts Committee (PAC) has directed the Comptroller and Auditor General (CAG) to conduct a performance audit of the project.

NH-66 collapse: PAC directs CAG to do performance audit

The Hindu Bureau
NEW DELHI

Days after a section of the under-construction six-lane National Highway 66 collapsed at Kooriyad in Malappuram district of Kerala, Parliament's Public Accounts Committee (PAC), headed by Congress leader K.C. Venugopal, directed the Comptroller and Auditor General (CAG) to conduct a comprehensive performance audit, scrutinising the contract terms, and the road design that led to the collapse.

As per sources, officials from both the Ministry of Road and Transport and the National Highways Authority of India (NHAI) admitted at the meeting that the collapse was due to design flaw.

Other projects

The panel also asked the NHAI Chairman to inspect the affected stretch and review other projects in the State. It is learnt that Mr. Venugopal said there had been multiple complaints regarding construction flaws in national highway stretches across seven districts in Kerala.

Recounting his recent visit to Kooriyad, Mr. Venugopal reportedly said the road had been constructed in an area full of fields and swamps, without a strong foundation or consideration of local conditions.

Significance of the Issue:

- **Admission of Design Flaw:**Officials from the Ministry of Road Transport and Highways and NHAI accepted that the collapse was due to poor design planning, especially in a region with swamps and fields.

- **Accountability in Infrastructure Projects:**PAC's intervention reflects growing parliamentary oversight over executive lapses in infrastructure development.
- **Wider Pattern of Complaints:**Reports of multiple structural flaws across seven districts in Kerala suggest a systemic problem in highway construction, not an isolated incident.

Broader Concerns Highlighted:

1. **Neglect of Local Conditions:**
   - Construction in swampy areas without adequate foundational support highlights lack of geotechnical assessment.
   - Shows failure to align engineering practices with environmental and soil conditions.
2. **Need for Robust Monitoring Mechanisms:**
   - Questions the quality assurance process followed by NHAI and the implementing contractors.
   - Absence of effective third-party inspections during project execution.
3. **Impact on Public Safety and Economy:**
   - Such collapses endanger lives, delay connectivity, increase public costs, and erode citizen trust in public infrastructure.
4. **Fiscal Oversight and Audit Role:**
   - PAC's directive for CAG audit underlines the importance of financial and performance audits in ensuring transparency and value for money in public projects.

Way Forward:

- Mandatory Geo-technical Surveys before road approvals.
- Institutionalise Third-party Quality Checks at various stages.
- Strengthen Disaster Resilience criteria in highway design.
- Regular Performance Audits by independent bodies like CAG.
- Incorporate local stakeholder consultation in sensitive construction zones.

Conclusion:

The NH-66 collapse is not just a technical failure but a governance lapse. It underlines the urgent need for a holistic, accountable, and region-sensitive approach to infrastructure development. With rising investments in public infrastructure under national schemes like Bharatmala, it is critical to integrate quality, safety, and accountability at every step.

UPSC MainsPractice Question

Ques: Discuss the role of the Comptroller and Auditor General (CAG) in ensuring infrastructure accountability in India. Illustrate with recent examples. **(250 Words)**

In a historic moment for gender inclusion in the armed forces, the first batch of 17 women cadets graduated from the National Defence Academy (NDA), Pune, as part of the 148th NDA course. This comes in the wake of the Supreme Court's 2021 landmark judgment, which opened NDA entry to women for the first time.

First batch of women cadets graduates from NDA in Pune

Convocation ceremony marks historic moment for women in the Indian armed forces; cadet Shriti Daksh secures first place in BA stream to win Silver Medal and Chief of Air Staff Trophy

Snehal Mutha
MUMBAI

The first batch of 17 women cadets graduated from the National Defence Academy in Pune on Thursday, marking a historic moment for women in the Indian armed forces.

At least 339 cadets were given degrees during the convocation ceremony of the 148th NDA course. The academy trains cadets for the Army, Navy, and Air Force.

Division cadet Shriti Daksh etched her name in the history books as she became the first woman cadet to receive the Silver Medal and Chief of Air Staff Trophy for securing first rank in the BA stream.

Lucky Kumar received the Chief of Army Staff Trophy for topping the B.Sc. stream, and battalion cadet Captain Prince Kumar Kushwaha lifted the Chief of Naval Staff Trophy for topping the computer science branch.

Academy cadet Captain Udayveer Singh Negi emerged topper in the B.Tech. stream.

Primed to serve: Cadets after the 148th convocation ceremony held at the National Defence Academy in Pune on Thursday. EMMANUAL YOGINI

The Vice-Chancellor of the Deen Dayal Upadhyaya Gorakhpur University, Poonam Tandon, who was the chief guest at the event, referred to the excellent performance of women cadets while addressing the graduands: "Service has no gender and your presence is historic."

NDA Commandant Vice-Admiral Gurcharan Singh hailed the historic event, calling the woman cadets "hope". He further said achieving name and fame in their service to the nation will be their "*guru-dakshina*" to the NDA.

SC verdict

After a Supreme Court verdict in 2021, the Union Public Service Commission (UPSC) permitted women to apply for the NDA examination for the first time.

The cadets were given B.Sc., BA, and B.Tech. degrees from the Delhi-based Jawaharlal Nehru University (JNU).

The passing out parade of the 148th course of the academy will be held on Friday.

Significance of the Event:

1. **Breaking Gender Barriers in Defence:**
   - For decades, NDA was a male-only institution. The graduation of women cadets marks a transformational shift in India's defence policy and gender representation.
2. **Upholding Equality through Judicial Intervention:**
   - The SC verdict mandated that equal opportunity must be extended to women, aligning with constitutional values of equality, non-discrimination, and Article 14.
3. **Symbol of Meritocracy:**
   - Cadet Shriti Daksh, who secured the first rank in the BA stream, proves that inclusion does not compromise standards; rather, it enhances diversity and merit.

Broader Implications:

1. **Institutional Change in Armed Forces:**
   - The induction of women into NDA promotes inclusive training and leadership development from the early stages.
   - It encourages the forces to adapt infrastructure, mindset, and command culture for gender parity.
2. **Inspiration for Gender Equality:**
   - It serves as a powerful signal for young girls across India to aspire for leadership roles in traditionally male-dominated domains.
3. **Civil-Military Reforms:**
   - Reflects the broader civil-military alignment with democratic values, where court-led policy change influences institutional transformation.
4. **Need for Supportive Measures:**
   - Beyond induction, focus is needed on equal career progression, postings, command roles, and gender-sensitive working environments.

Conclusion:

This milestone is more than ceremonial—it is a symbol of changing times where gender no longer defines capability. The women cadets of NDA 148 are not just graduates but trailblazers of a new era in India's defence preparedness and gender equality framework. The true test, however, lies ahead—in institutional acceptance, equal opportunity in combat roles, and career progression without bias.

UPSCMainsPractice Question

Ques:Service has no gender. In the light of the induction of women cadets in NDA, critically examine the progress and challenges in achieving gender equality in the Indian armed forces.(250 Words)

Despite global progress in reducing tobacco use through taxation and regulation, tobacco remains highly affordable and accessible in India. This affordability is fuelling a rise in tobacco-related cancers, both smoked and smokeless, with significant health and economic consequences.

Tobacco affordability fuelling cancer epidemic in India

Unlike in other countries where higher prices have deterred smoking, prices remain low in India; tobacco affordability undermines the World Health Organization's MPOWER framework and weakens control, hindering efforts to reduce tobacco-related cancers; implementing robust policies are the need of the hour to curb tobacco use

WORLD NO TOBACCO DAY

Vid Karmarkar

Take a walk around any Indian office, and you're likely to spot some employees gathered outside, sipping tea and smoking a cigarette. Sandeep, a young marketing professional, calls such "sutta (smoking) breaks" a creative escape. "It's time to take a break from work stress and make connections. The chai-sutta break is where ideas flow as freely as the smoke." But for many non-smokers, this come at a cost – involuntary exposure to second-hand smoke.

According to GATS2 data, nearly 42% of men and 14% of women in India use tobacco. Home to 70% of the world's smokeless tobacco (SLT) users, SLT is preferred over smoked tobacco in the country. In smoked tobacco, the bidi is favoured over cigarettes, especially in rural and low-income groups. Despite the preference for bidis, India has seen the largest increase in the market share of cigarettes globally.

Rajesh, a shopkeeper in Mulshi, a village near Pune, says, "Bidis are what people here can afford. Cigarettes are for the city folks. But now even in villages, people want to try cigarettes because they think it's modern."

Both SLT and smoked tobacco drastically increase cancer risk, particularly for lung, head, neck, stomach, and pancreatic cancers. "My uncle chewed tobacco for years," said Sunita, a homemaker from Maharashtra. "He passed away from mouth cancer, and we didn't realise how dangerous it was until it was too late," she says.

India ranks first globally in male cancer incidence and mortality rates. Among tobacco-related cancers in males, lung cancer leads globally, while in India, lip and oral cancers top the list, followed by lung cancer. "Every time I see someone with a gutkha (which is banned in India) pouch in their pocket, I feel like warning them," says Manish, a college student whose father died of oral cancer.

Along with the health burden, tobacco use imposed an economic cost of ₹1.77 lakh crore (1.04% of India's GDP) in 2017-2018. Smoking accounted for 74% of these costs, while SLT use made up 26%. With tobacco use on the rise, both health and economic costs are projected to increase. Rajiv, who quit smoking after a cancer scare, says: "I never realised the financial toll until I saw the hospital bills. Smoking doesn't just cost you money – it costs you your life and the lives of those who depend on you."

Call to action: People taking part in a rally against smoking on the occasion of World No Tobacco Day which is observed annually on May 31. K. MURALI KUMAR

India faces a dual challenge of significant health and economic burdens from tobacco-related cancers and the complexities of lung cancer screening in a tuberculosis-endemic country. This underscores the urgent need for evidence-based anti-tobacco policies as a primary prevention strategy. However, the tobacco industry's influence – through policy interference, pricing tactics to maintain affordability, targeted marketing, dense tobacco shop networks, and a lack of political will – ensures widespread tobacco accessibility.

"The fact that a bidi costs less than a cup of tea is a tragedy," says Ashok, a retired clerk. "When I was younger, I didn't think twice about buying a bidi. Now I see how cheap tobacco ruins lives." Taxation is a critical yet underutilised tool in reducing tobacco use. Despite the proposed GST increase to 35%, it falls short of the World Health Organization's recommendation of taxing tobacco at 75% of its MRP to effectively deter use. Even with the steep increase in tobacco tax, its impact decreases if consumers' income increases significantly.

Unlike in many countries where higher prices have curbed smoking, rising incomes in India – especially among the 450 million middle class – have outpaced tax hikes. With more purchasing power, tobacco remains affordable. The 2024 Union Budget's unchanged tobacco taxes worsened the issue, enabling "undershifting," where manufacturers absorb tax hikes to grow their markets.

Unit pricing

A key factor in tobacco affordability is its unit pricing. A pack of bidis has a median price of ₹12 but can be found for as little as ₹5. Similarly, smokeless tobacco products have a median price of ₹5, with some being sold for as low as ₹1. Shankar, a daily wage labourer and cancer patient says he could afford to buy a few packs every day. While cigarette packs have a median price of ₹95, cheaper options are available for as low as ₹5. Sonia, a college student, says, "Cigarettes are so cheap that they're easy to buy. The government needs to make it harder for people like us to afford them."

To enhance affordability, cigarettes are often sold as single sticks – a practice banned in 88 countries but not in India. Priced at approximately ₹15, single sticks become easily affordable and bypass graphic health warnings. Research shows that 87% of Indian cigarette vendors sell single sticks, frequently operating near tea stalls, reinforcing the widespread "chai-sutta" culture.

In India where a significant proportion of the population earns ₹170-180 per day, along with the addictive potential of tobacco, makes the current tobacco pricing affordable to fulfill their cravings.

Tobacco affordability undermines the WHO's MPOWER framework and weakens tobacco control, hindering efforts to reduce tobacco-related cancers. Reducing tobacco use is vital for cutting cancer incidence. Implementing robust anti-tobacco policies can be effective in curbing tobacco use.

Regular tax hikes that outpace income growth can make tobacco products unaffordable, discouraging their use. Additionally, banning single-stick sales can reinforce health warnings and curb impulse purchases. Further, allocating tobacco tax revenue towards public health initiatives, such as cancer screenings in underserved areas, can have a significant impact. Enforcing plain packaging with prominent health warnings can also reduce tobacco's appeal, while restricting sales near tea stalls can help break the 'chai-sutta' association. Robust enforcement, through regular inspections and penalties, is essential to uphold these regulations.

(Dr. Vid Karmarkar is a social entrepreneur, researcher, writer and advocate of advancing equitable cancer care and global health. He is also the founder of the Canseva Foundation, a registered nonprofit organisation. vid.karmarkar@gmail.com)

THE GIST

- India ranks first globally in male cancer incidence and mortality rates. Among tobacco-related cancers in males, lung cancer leads globally, while in India, lip and oral cancers top the list, followed by lung cancer
- Along with the health burden, tobacco use imposed an economic cost of ₹1.77 lakh crore (1.04% of India's GDP) in 2017-2018. Smoking accounted for 74% of these costs, while SLT use made up 26%
- India faces a dual challenge of significant health and economic burdens from tobacco-related cancers and the complexities of lung cancer screening in a tuberculosis-endemic country. This underscores the urgent need for evidence-based anti-tobacco policies as a primary prevention strategy

Key Concerns:

1. **High Prevalence of Use:**
    - India is home to 42% of male and 14% of female tobacco users.
    - Over 70% of global smokeless tobacco (SLT) users live in India.
    - Cultural normalization (e.g., "chai-sutta" breaks) contributes to regular usage.
2. **Affordability of Tobacco Products:**
    - Bidis, gutkha, and cigarettes are sold for as little as ₹1 to ₹15, making them affordable even for daily wage workers.
    - Single-stick sales, banned in 88 countries, continue in India, circumventing graphic health warnings.
3. **Public Health Impact:**
    - India ranks first globally in male cancer mortality from tobacco-related causes.
    - Lip and oral cancers are the most common in India, followed by lung cancer.
4. **Economic Burden:**
    - Tobacco-related diseases cost India ₹1.77 lakh crore annually (1.04% of GDP).
    - A significant portion is due to hospitalization, loss of productivity, and long-term care.

Systemic Issues Undermining Control Efforts:

- **Inadequate taxation:** Current tax levels (around 35%) fall short of WHO's 75% MRP recommendation.
    - Policy interference by the tobacco industry, especially through pricing strategies like undershifting (absorbing tax hikes).
- **Poor regulation enforcement:** Easy access near schools, tea stalls, and public places.
- **Low political will:** Minimal tobacco tax revision in recent budgets reflects lack of urgency.

Recommendations & Policy Actions:

1. Regular tax hikes exceeding income growth to reduce affordability.
2. Ban single-stick cigarette sales to ensure packaging-based health warnings are seen.
3. Enforce plain packaging with graphic health messages.
4. Restrict sales near schools and tea stalls to break habitual consumption patterns.
5. Redirect tobacco tax revenue towards cancer screening and cessation programs.
6. Strong legal enforcement including penalties for violations and regular monitoring.

Conclusion:

India's tobacco crisis is not merely a public health issue — it is a governance and economic challenge. Despite evidence and international best practices, India lags in enforcing aggressive anti-tobacco policies. Affordability, bolstered by inadequate regulation, continues to fuel a cancer epidemic that

disproportionately affects the poor. A multi-pronged approach — combining taxation, legislation, public awareness, and institutional accountability — is urgently needed.

UPSC MainsPractice Question

Ques: Tobacco affordability is a policy failure that fuels India's cancer burden. Discuss with reference to the WHO MPOWER framework.**(250 words)**

Page 10: GS 3 : Internal Security& Science &Technology

Operation Sindoor, conducted by India in retaliation to the Pahalgam terror attack, marked a historic first in South Asian warfare — the large-scale use of Unmanned Aerial Systems (UAS) and autonomous platforms by both India and Pakistan. This conflict marked the emergence of a new paradigm of algorithm-driven warfare, where armed drones, loitering munitions, swarm attacks, and digital deterrence replaced traditional combat.

Autonomous warfare in Operation Sindoor

In the recent India-Pakistan war, over four days of hostilities, both sides effectively rewrote their rules of engagement, ushering in a 'new normal' of airborne deterrence without pilots, but with autonomous platforms, armed drones and loitering munitions

FULL CONTEXT

Rahul Bedi

Launched in early May, in retaliation to the April 22 Pahalgam terror attack, Operation Sindoor marks a historic milestone, in which Unmanned Aerial Systems (UAS) played a primary role in direct military combat between two nuclear-armed neighbours, signalling an uncharted era of drone-centric warfare in South Asia.

Over four days of hostilities, both sides effectively rewrote their rules of engagement, ushering in a 'new normal' of airborne deterrence without pilots, but with autonomous platforms, armed drones and loitering munitions, all operating below the threshold of a full-scale war, and shaping a calibrated, escalation-managed conflict.

In the 48 hours preceding Operation Sindoor, Israeli Heron MK-II and indigenously designed TAPAS-BH-201/ Rustom-II-Medium-Altitude Long-Endurance (MALE) Intelligence, Surveillance and Reconnaissance (ISR) Unmanned Aerial Vehicles (UAVs) are believed to have flown deep into Pakistani airspace to gather electronic and signals intelligence and thermal signatures of suspected Islamist terror camps.

Thereafter, from May 7 onwards, after the Indian Air Force (IAF) attacked nine targets inside Pakistan, both sides employed a broad spectrum of UAS – from ISR UAVs to armed drones, kamikaze loitering munitions, electronic decoys and quadcopters – as dual-purpose tools for real-time intelligence gathering and precision strikes. And as this drone war intensified, both countries sought to dominate the battlespace through persistent aerial surveillance by mapping out enemy air defences, missile batteries, command centres, troop clusters and logistical nodes. Decoy drones too were widely employed to spoof radars, 'bait' air defence systems and exhaust interceptors, minimising risk to manned assets, before ceasefire ensued on May 10.

New war: A soldier looks at a drone at the Akhnoor sector near the LoC in Jammu on May 19. AFP

India's array of aerial systems

In the intervening period, India claimed to have downed some 600 Pakistani drones, releasing intercepted footage and wreckage to reinforce its assertions in a high-stakes information war, paralleling the kinetic exchanges. Pakistan, in turn, alleged that 300-400 Indian drones had unsuccessfully targeted its military and strategic infrastructure, before being shot down. India has neither confirmed nor denied these avowals, citing Operation Sindoor's enduring operational status for its silence.

Open-source intelligence and drone-tracking data, meanwhile, revealed that India's offensive against Pakistan featured a diverse UAS inventory. It was spearheaded by indigenously developed loitering munitions like the GPS-guided Nagastra-I and Israeli-origin Harop drones, capable of autonomously homing in on enemy radar systems.

To overwhelm Pakistan's air defences, India also deployed swarm drone formations developed jointly by the Defence Research and Development Organisation and private contractors to create radar clutter, trigger premature defensive responses and saturate surveillance networks. Priority targets included ammunition depots, Surface-to-Air Missile (SAM) batteries, radar sites, and forward operating bases.

The strikes were delivered in carefully sequenced waves. Initial sorties deployed decoy drones and electronic warfare payloads to saturate radar coverage and provoke early, albeit futile SAM launches. These were followed by precision loitering munitions and armed UAVs, guided in real-time by Heron MK IIs and TAPAS-BH-201/ Rustom-IIs. Quadcopters and micro-UAVs played a critical role in relaying live ISR feeds and target acquisition data via the Army's Integrated Battle Management System (IBMS) to forward units, ensuring dynamic targeting and reaction.

Notably, media reports claimed that India's drone strikes disrupted a cricket match in Rawalpindi, forcing a stadium evacuation due to air defence alarms. Another significant Harop strike, reportedly destroyed a Chinese-supplied HQ-9 air defence system near Lahore, delivering both a psychological blow and a strategic setback to Pakistan's layered air defence shield.

Consequently, military analysts noted that India's overwhelming use of varied UAS to deliver calibrated, cross-border strikes without risking manned aircraft, represented the emerging regional model of deterrence. They said it also visibly showcased India's growing competence in autonomous, cost-effective, and networked warfare, demonstrating a significant shift in the balance of aerial power in South Asia.

Pakistan's retaliation

Pakistan, for its part, in its reactive Operation Bunyan-um-Marsoos (wall of lead), deployed a range of UAS, including its indigenously developed Shahpar (feather)-II MALE UAVs, armed Burraq (lightening) drones, Turkish-origin Bayraktar TB2s, and Chinese-supplied CH-4 and Wing Loong II platforms. These assets were complemented by CH-901 and WS-43 loitering munitions from China and domestically produced kamikaze drones, launched at multiple targets across a 1,500-kilometre expanse, stretching from Kashmir in the north to Bhuj in the west.

While the Shahpar-IIs, TB2s, and Wing Loong IIs primarily conducted ISR missions – streaming real-time imagery of Indian troop concentrations, artillery positions, and logistics depots – Pakistan's loitering munitions targeted radar stations, forward operating bases and critical Army and IAF command nodes in the northern and western sectors. However, these attacks were effectively neutralised by India's robust, multi-tiered air defence grid, inflicting minimal or no damage at all.

Strategic urban and military infrastructure hubs – including Jammu, Pathankot and Amritsar in Punjab, Bikaner and Jaisalmer in Rajasthan, and Bhuj in Gujarat – too were frequently targeted. But despite the density of these assaults, India's integrated air defence network –comprising layered radar coverage, SAM batteries, automated threat-response mechanisms, and upgraded Cold War-era legacy platforms and systems – mitigated damage, preventing disruption.

India's multi-layer air defence system

Pakistan repeatedly sought to probe and bring to heel India's Integrated Air Command and Control System (IACCS) – its air defence nerve centre – by launching drones via varied routes, altitudes and diverse timings, to disrupt its communication nodes and forward-deployed command centres, albeit unsuccessfully. The IACCS fuses surveillance inputs from ground-based radars, airborne early warning and control platforms, satellites, and other sensors into a centralised but distributed command-and-control network. It integrates with SAM systems and fighter aircraft, enabling the rapid detection, tracking, and interception of low-altitude threats, including UASs. Its built-in mechanisms ensured continuity of operations, even if any individual nodes were damaged, jammed or destroyed.

Pakistan attempted to overload the IACCSs radar coverage, confuse response loops, and expose vulnerabilities for follow-on drone or missile strikes. However, military officials confirmed the IACCS's core network remained intact, with all and any temporary disruptions swiftly mitigated through alternate data links and pre-positioned mobile radars.

Analysts further noted the system's 'mesh' architecture allowed seamless failovers when nodes were hit, with satellite uplinks and mobile platforms sustaining full situational awareness. The IACCS also displayed its Directed Energy Weapons (DEWs) capability in which high-powered lasers or microwaves, via a real-time network, detected, tracked and neutralised airborne threats like drones speedily.

Complementing the IACCS at the tactical level was the Akashteer (Sky Arrow) air defence control and reporting system, developed by Bharat Electronics Limited, which provided a digitised command layer for Army Air Defence units, enabling seamless coordination between sensor units and weapon platforms. Designed to rapidly disseminate targeting data and manage low-level threats – including UAVs – it ensured that frontline SAM units could engage targets with minimal delay, even under electronic warfare or communication stress.

The accompanying air defence shield was built around a layered architecture combining retrofitted legacy Low-Level Air Defence (LLAD) systems with advanced missile platforms in an unparalleled innovative mix that remains a hallmark of the Indian military's improvisation.

Ingeniously upgraded with radar-directed fire capability and electro-optical sights, Cold War-era systems from the early 1960s, comprised the LLAD network for close-in protection against drones. These included Pechora and OSA-AK SAM systems and ZSU-23-4 Shilka, ZU-23-2 twin barrel 23mm anti-aircraft (AA) guns from Soviet times, and the L/70 Bofors 40mm AA platform dating back to the 1940s. Army and Border Security Force snipers too were part of the LLAD structure, shooting down numerous incoming drones in Jammu, Punjab and Rajasthan.

These 'heirloom' LLAD platforms were supplemented by the Israeli SPYDER short and medium-range air defence missile system using Python-5 and Derby missiles for point defence against UAVs, cruise missiles, and aircraft.

A new kind of war

The domestic Akash and Akash-NG (New Generation) missile system provided medium-range coverage, while the long-range Barak-8, jointly developed with Israel, defended high-value assets and strategic nodes from aircraft, drones, and ballistic/cruise missiles. These were all backed by Russia's Almaz-Antey S-400 'Triumf' self-propelled surface-to-air missile system – renamed Sudarshan Chakra – one the world's best, of which India had acquired five units for $5.5 billion in October 2018 and, so far, taken delivery of three.

All these systems were centrally integrated through the IACCS, enabling coordinated, real-time responses and full-spectrum aerial threat mitigation.

In conclusion, Operation Sindoor was not merely a skirmish; it was a seismic shift in which two nuclear-armed rivals stepped into the age of autonomous warfare, where deterrence is digital, and dominance is algorithmic. And as the smoke subsides, one truth remains: the next war will not begin with a soldier's charge, but with the silent whir of drones in the sky.

Rahul Bedi is a veteran journalist based in New Delhi and Chandigarh specialising in military, defence and security matters.

THE GIST

- Open-source intelligence and drone-tracking data, meanwhile, revealed that India's offensive against Pakistan featured a diverse UAS inventory.
- Pakistan repeatedly sought to probe and bring to heel India's Integrated Air Command and Control System (IACCS) – its air defence nerve centre – by launching drones via varied routes, altitudes and diverse timings, to disrupt its communication nodes and forward-deployed command centres, albeit unsuccessfully.
- Operation Sindoor was not merely a skirmish; it was a seismic shift in which two nuclear-armed rivals stepped into the age of autonomous warfare, where deterrence is digital, and dominance is algorithmic.

Key Highlights of Operation Sindoor:

India's Strategy:

- **Mass deployment of UAVs:** Israeli Heron MK-II, Indian TAPAS-BH-201, Rustom-II, Nagastra-1, and Harop drones.
- Swarm drone formations overwhelmed Pakistani radar and SAMs.
- Electronic warfare drones used as decoys to spoof and exhaust enemy defence systems.
- Targeted critical Pakistani assets like missile batteries, radar stations, and command centers.
- Claimed downing 600 Pakistani drones, establishing superior air surveillance.

Pakistan's Counter-Offensive – Operation Bunyan-um-Marsoos:

- Used Shahpar-II, Burraq drones, Chinese CH-4, Wing Loong II, and Bayraktar TB2s from Turkey.
- Deployed CH-901 and WS-43 loitering munitions against India's northern and western assets.
- Lacked precision and largely neutralized by India's multi-layer air defence systems.

India's Defence Infrastructure:

Multi-Layer Air Defence System:

- **IACCS (Integrated Air Command and Control System):** Core of India's air defence, capable of AI-based threat response, real-time radar fusion, and seamless failover.
- **Legacy LLAD systems:** Upgraded Cold War-era Soviet AA platforms used innovatively.
- **Modern Missiles:** Akash, Akash-NG, Barak-8, and S-400 'Sudarshan Chakra' integrated via IACCS.
    - Directed Energy Weapons (DEWs) like lasers and microwave tech used to neutralize drones.
- **Akashteer System:** Army-level real-time air defence coordination layer.

Strategic Implications:

1. **Drone Warfare has Matured:** Operation Sindoor signifies the mainstreaming of autonomous weapons in South Asia.
2. **Digital Deterrence:** Warfare is shifting from manpower-based to AI-networked command centers and automated platforms.
3. **Cost-Effective Power Projection:** UAVs provide low-risk, high-impact strike capability across borders.
4. **Escalation Control:** Maintained action below full-scale war, showing new doctrine of escalation management.

Lessons & Future Outlook:

- India must scale indigenous drone production (e.g., Nagastra-1) for strategic autonomy.
- Cybersecurity and AI-based threat detection will become the next frontier in national defence.
- There is an urgent need to frame international norms for autonomous warfare, especially in nuclear neighbourhoods.
- Border states must be equipped with localized air defence, drone jamming systems, and rapid response teams.

UPSC Mains Practice Question

Ques: What are the ethical, strategic, and operational challenges posed by the use of AI-enabled autonomous weapons in modern conflicts?(**250 words)**

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Rewriting the script of early childhood education

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Strategic investments in early childhood education and engaging parents will help young learners

"Some kids win the lottery at birth; far too many don't – and most people struggle to catch up," said the Nobel Laureate Prof. James Heckman. This holds true for India as well where its employment problem is partly a consequence of this "lottery of birth". A child born in India has a one-in-five chance of being born into poverty, affecting their health, nutrition, learning and earning potential. Yet, there is a way to beat these odds. From the decision by Uttar Pradesh to hire 11,000 dedicated Early Childhood Care and Education educators for Balavatikas to Odisha launching Shishu Vatikas and Jaduipedi Kits, States in India are showing the way.

The Heckman curve was a powerful economic model that provided a simple yet profound insight – of the relationship between age and the rate of return on investments in human capital. Heckman found that every dollar invested in early childhood education yields a return that ranges from $7 to $12, with lasting impacts: children who receive quality early education are four times more likely to have higher earnings and three times more likely to own a home as adults. By age five, many gaps in outcomes – such as earning potential and quality of life –are already evident. Children often struggle throughout life if motivation and learning habits are not nurtured early.

Learning outcomes

Yet, India's ECE system faces three major challenges. First, children are not receiving sufficient instructional time. Nearly 5.5 crore children between ages three to six are enrolled in 14 lakh operational Anganwadis and 56,000 government pre-primary schools. However, Anganwadi workers spend only 38 minutes per day on preschool instruction, which is far short of the scheduled two hours, and only 9% of pre-primary schools have a dedicated ECE teacher. We are planting trees without the right care to help them grow. The effects are reflected in learning outcomes. The India Early Childhood Education Impact Study found that only 15% of pre-primary children could match basic objects, a skill essential for letter recognition in Class one. Similarly, only 30% could identify larger and smaller numbers, which are foundational for arithmetic. As a result, children often start formal schooling without the skills they need, with many bypassing essential ECE years entirely: 2% of three-year-olds, 5.1% of four-year-olds, and nearly one-fourth of five-year-olds are enrolled directly in Class one.

The issue of resources, engaging parents

Second, the thoughtful optimisation of resources for early childhood education remains a challenge. The Government of India spends only ₹1,263 a child annually on ECE compared to ₹37,000 a student on school education – largely on producing teaching-learning materials that are often underused. There simply are not enough teachers to implement these resources, and there is a lack of oversight – one supervisor is responsible for monitoring 282 Anganwadis. To improve oversight, we need targeted funding to hire more supervisors and dedicated ECE teachers. These measures, though modest, promise high returns.

Uttar Pradesh has now moved ahead on the hiring of nearly 11,000 ECE educators for Balavatikas in all districts. The State also organised a six-day residential training programme for 50 master trainers from 13 districts to train them on ECE pedagogy. Odisha has taken the decision to open Shishu Vatikas in all government schools to make children in the age group five to six school ready.

While increased funding would lead to immediate improvements, sustaining these gains depends on engaging parents, and here lies the third challenge. Most parents care deeply about their children's education but may lack guidance on supporting early learning. Empowering parents with simple, effective ECE practices can make a significant difference. For instance, providing worksheets or encouraging their participation in ECE centre activities can deepen their involvement.

In Madhya Pradesh, the monthly Bal Choupal programme engages with parents directly by showing them the importance of play-based learning. With smartphone access nearly universal, parental engagement can be further strengthened through WhatsApp or EdTech apps, allowing parents to support their children's development.

In perspective

Reversing these odds may seem like an uphill battle, but with targeted funding and increased parental involvement, we can provide our children with the foundation they deserve.

By 2047, over a billion Indians will enter the global workforce, presenting an unprecedented opportunity to reshape India's role in the world economy. Strategic investments in ECE and engaging parents in their children's learning journey could help 200 million Indians escape the lottery of birth and give today's young learners the chance to become tomorrow's leaders. This is a critical pathway to realising India's vision of becoming a true Vishwa Guru, empowering generations to come.

Paper 02:Social Justice

UPSC Mains Practice Question:Public investment in ECE yields the highest return on human capital. Examine the relevance of the Heckman Curve for India's demographic dividend.(250 words)

Context :

In the backdrop of persistent inequality and learning gaps, the article by Shaveta Sharma-Kukreja highlights how early childhood care and education (ECE) is crucial for breaking the cycle of poverty. The

article references the Heckman Curve, which economically justifies investing in early years to build strong human capital.

Key Issues Identified:

1. **Low Instructional Time in ECE Centers:**
   - Anganwadi workers spend only 38 minutes/day on preschool education instead of the recommended 2 hours.
   - Only 9% of pre-primary schools have dedicated ECE teachers.
   - Foundational gaps are visible as only 15% can perform basic matching tasks and only 30% understand basic numeracy by the time they start Class I.
2. **Inequitable and Insufficient Funding:**
   - ECE receives only ₹1,263 per child/year vs. ₹37,000 for school education.
   - High supervisor-to-centre ratio (1:282) reflects poor administrative capacity.
3. **Parental Engagement Deficit:**
   - Parents are concerned but lack awareness and tools to support early learning.
   - Low-cost tech like WhatsApp or EdTech apps remain underutilized.

Positive Developments:

- Uttar Pradesh is hiring 11,000 dedicated ECE educators and running residential training programs.
- Odisha has launched Shishu Vatikas and Jaduipedi kits to enhance school readiness.
- Madhya Pradesh's Bal Choupal program shows promise by directly engaging parents in understanding play-based learning.

Implications:

- Foundational education directly affects future productivity and earning potential.
- Missed opportunities in ECE weaken India's demographic dividend.
- The gap between early potential and later outcomes requires systemic correction through policy prioritization, budget reallocation, and community involvement.

Recommendations:

1. **Institutionalize Dedicated ECE Workforce:**Recruit and train educators specifically for the 3–6 age group across all states.
2. **Increase Per-Child Funding:**Prioritize ECE in budget allocations with proper tracking and utilization.
3. **Enhance Oversight & Accountability:**Improve supervisor capacity and real-time monitoring of Anganwadi functioning.

4. **Leverage Technology for Parental Involvement:**Use WhatsApp/EdTech tools for parental training, guidance, and monitoring.
5. **Mandate Pre-Primary Education:**Include 3 years of ECE under RTE Act to ensure universal coverage and quality.

Conclusion:

India's aspiration to become a global economic leader by 2047 rests significantly on its human capital quality, which begins with early childhood education. By investing early, supporting frontline educators, and empowering parents, India can break the cycle of intergenerational poverty and prepare its children to thrive. Early intervention is not just a social imperative, but a national development strategy.