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The upcoming COP-30 in Belem, Brazil, marks a crucial moment in global climate diplomacy. Unlike past conferences that emphasized ambitious new pledges, this edition aims to prioritize practical implementation of already agreed solutions. With growing climate vulnerabilities, political disruptions such as U.S. withdrawal from the Paris Agreement, and scientific warnings of overshooting 2°C warming, the focus on execution reflects both urgency and realism.

Key Analysis:

1. Shift in Approach – Negotiation vs Implementation:

- Traditionally, COPs revolve around drafting consensus texts, a complex process often slowed by diverse national interests.
- COP-30 seeks to de-couple negotiations from implementation, allowing parallel progress—policy consensus on one hand, and practical actions on the other.

2. Known Solutions in Focus:

- Emphasis on renewable energy transition, forest protection (especially Amazon), climate finance delivery, and technology transfer.
- Brazil, hosting in the Amazonian gateway city of Belem, aims to highlight nature-based solutions and indigenous stewardship.

3. Challenges to Global Climate Action:

- Political uncertainties: U.S. disengagement under Trump has weakened multilateral consensus.
- Trade disruptions (tariffs) affect green technology flows and climate finance.
- Current commitments, even if fully met, still imply 2.6°C warming, overshooting Paris Agreement goals.

COP-30 to focus on known solutions, says its President

Jacob Koshy
NEW DELHI

Instead of big-ticket announcements, the forthcoming edition of the UN climate summit is expected to focus on “well-known solutions”, with the host country, Brazil, moving to cleave the “negotiations” aspect of climate talks from the “implementation” of agreements.

The UN Framework Convention on Climate Change (UNFCCC) will hold its 30th Conference of Parties (COP-30) in November, in the Brazilian port city of Belem, a gateway to the Amazonian rainforest.

With U.S. President Donald Trump having withdrawn his country from the UNFCCC's Paris Agreement for the second time and casting global trade into flux with his tariffs, diplomats and seasoned climate negotiators said that this was a “difficult year and things could go bad” for the COP process. However, COP-30 president André Corrêa do Lago, a Brazilian Minister, insisted that there are also “grounds for optimism”. Addressing a conclave organised here by the Council on Energy Environment and Water (CEEW), he said: “In the run-up to COP-30, we are trying to decouple the process of negotiation - and agreements



André Corrêa do Lago

like the UNFCCC are designed for negotiation - from that of implementation.”

The typical process of climate negotiations in most COPs focusses on creating a “text”, said Mr. Lago, noting that it was “horribly difficult” to assemble all countries and have them agree on one.

COP-21 Paris Agreement

The Paris Agreement ironed out at COP-21 in 2015 is considered historic as it committed all countries, not just developed countries, to take action to contain greenhouse gas emissions to keep the increase in average global temperatures from exceeding 2 degrees Celsius and “as far as possible below 1.5C” by the turn of the century. However, scientific assessments suggest that the impact of all countries’ current commitments, even if implemented, will still lead to an increase of more than 2.6 C.

4. Opportunities and Optimism:

- COP-30 President André Corrêa do Lago stresses that despite difficulties, grounds for optimism exist—notably technological advances in green energy, rising public climate awareness, and renewed leadership from Global South countries.
- Implementation-led focus may enhance credibility of COP process, often criticized for lofty but unfulfilled promises.

Conclusion:

COP-30's pragmatic pivot from high-stakes negotiations to grounded, actionable climate solutions reflects an evolution in global climate governance. For India and other developing nations, this shift presents an opportunity to demand equitable climate finance, accelerate renewable adoption, and strengthen adaptation strategies. Ultimately, success will depend on whether the world can translate agreed principles into measurable action before the window for keeping 1.5°C alive closes.

UPSC Prelims Practice Question

Ques: COP-30, scheduled to be held in 2025, will take place in which of the following locations?

- (a) Paris, France
- (b) Belem, Brazil
- (c) Katowice, Poland
- (d) Sharm el-Sheikh, Egypt

Ans : b)

UPSC Mains Practice Question

Ques: The Paris Agreement commits nations to limit warming to below 2°C, preferably 1.5°C. With current commitments projecting 2.6°C rise, evaluate the role of developing countries like India and Brazil in bridging the gap. **(150 Words)**

The Nilgiris, part of the Western Ghats—a UNESCO World Heritage Site and biodiversity hotspot—are witnessing drastic ecological changes due to land-use shifts over the past 170 years. A recent study published in *Global Change Biology* demonstrates how unconventional resources like natural history museum specimens, archival maps, and Bayesian statistical models can help reconstruct ecological histories and track biodiversity loss.

How dead birds, old maps are helping scientists track biodiversity loss

A new study's methods highlight the sort of innovation researchers can resort to in order to elicit new ecological and conservation wisdom. While field-based studies remain invaluable to understand the natural history of a habitat or species, data collected decades ago provide historical context to current baselines

Sutirtha Lahiri

The Nilgiri mountains in the Western Ghats are a biodiversity hotspot, home to a diverse array of birds, mammals, plants, and other life forms. Called the 'blue mountains' because of the blooming of *Strobilanthes* flowers, the Nilgiris are home to many species that are endemic and of conservation concern, including the Nilgiri pipit, the Nilgiri sholokali, and the Nilgiri laughingthrush.

In a study recently published in *Global Change Biology*, Vijay Ramesh and a team of scientists from institutes in India, the U.K., and the U.S. explored how changes in land use in the last 170 years affected the diversity of birds in the Nilgiri mountain range. The team compiled data from two sources: museums and field-based surveys.

'Lack of recognition'

First, they digitised geographical information from birds collected by British ornithologists in the late 1800s and which are preserved in natural history museums. Then they revisited and surveyed 42 of the same sites where historical surveys were conducted. The team also digitised a historical land-use map and compared it with current satellite images. In this way, the team found that the relative abundance of almost 90% of grassland birds in the Nilgiris has dropped.

The Nilgiri pipit and the Malabar lark—both of which are restricted to grassland habitats—in particular had suffered the steepest decline. Likewise, the team analysed GIS-based land-cover change to show that the extent of grasslands had decreased by 80% from 993 sq. km in 1848 to just 201 sq. km in 2018.

However, to their surprise, the scientists also found that the abundance of about 53% of forest birds has been relatively stable in the last century. This is because much of the grassland habitats had been replaced over time by wooded forests—in the form of either exotic plantations or woody invasive species—in response to increasing temperature.

This switch allowed forest-dependent species a new, alternative habitat, keeping their abundances stable, the team argued.

"Perhaps the biggest threat is the lack of recognition of grasslands as an important part of the landscape. People in the landscape understand this; however, the wider efforts are always targeted at conserving forests and planting trees," V.V. Robin, an author of the paper and associate professor at IISER Tirupati, said.

Beyond the findings themselves, the study's methods are notable. They highlight the sort of innovation



Strobilanthes kunthiana in full bloom on the slopes of the Nilgiris. SATHYAMOORTHY M

researchers can resort to in order to elicit new ecological and conservation wisdom. While field-based studies remain invaluable to understand the natural history of a habitat or species, data collected decades ago provide historical context to current biodiversity baselines. Historical data allow researchers to make comparisons across a longer time period, which is not possible with field studies.

Natural history museums are a particularly important repository of such historical data.

While many such museums around the world have a reputation for wowing visitors, the latter often engage with only a small fraction of specimens. The vast majority is in fact stored in large, climate-controlled facilities that are maintained by a team of curators, biologists, and facility managers. These are animals that naturalists have collected over centuries from around the world.

"Museums are vital for biodiversity research, especially in India, a global hotspot of species diversity," Pritha Dey, a moth biologist and head of the research collections facility at the National Centre for Biological Sciences, Bengaluru, said. "They preserve historical records of species distributions, help in taxonomic identification, and provide baseline data crucial for conservation, climate impact studies, and tracking biodiversity loss over time."

Scientists have used records from museums to describe many new species, understand the migration of birds, document changes in animals' body sizes in response to climatic changes, and to



Many specimens legally collected over a century are housed in these collections. What is the responsibility of museums to allow access?

SUSHMA REDDY
CURATOR OF BIRDS AT THE BELL MUSEUM OF NATURAL HISTORY AT THE UNIVERSITY OF MINNESOTA

elucidate the collapse of entire communities of birds. In the new study as well, the researchers examined specimens of birds collected in the early and late 1800s, which were preserved along with data about their location, the date on which the specimen was collected, and by whom.

With the number of specimens of each species from historical and modern periods, the scientists used a new Bayesian statistical method called field abundance—museum abundance (FAMA). This method allowed the researchers to estimate the relative abundance of each species in each time period, ultimately revealing a drastic decline in the abundance of grassland birds across the Nilgiris.

Access to archives

These and other scientists have also used different archival materials such as journals, old papers, and maps to complete unfinished stories of biodiversity collapse. In the study from the Nilgiris, for example, the researchers used the first land-cover map of the

Nilgiris, made by Captain John Ouchterlony, a British officer stationed in Madras. This map was stored as multiple tiles at the British Library and the Tamil Nadu State Archives. Using GIS and editing software, the team photographed the map, spent hours labelling the manner of land use at each pixel, and finally digitised it. Then they compared the information in the map with recent satellite images to assess changes and loss of habitat. This said, accessing samples and archival resources in museums remains a complicated task.

According to Ms. Dey, "Key challenges include lack of digitisation, limited funding, outdated infrastructure, and bureaucratic hurdles in accessing collections."

Most of the better natural history museums are in Western countries and accessing them is further limited by high travel costs and visa norms.

"The museum community has a problematic view of ownership of specimens," Sushma Reddy, an associate professor and curator of birds at the Bell Museum of Natural History at the University of Minnesota, said. "For example, there are many specimens legally collected from India and other countries over the past century that are housed in these collections. What is the responsibility of these museums to repatriate information or allow access?"

"[That is] something we are still struggling with as a museum community."

(Sutirtha Lahiri is a doctoral student in conservation science at the University of Minnesota. sutirtha1996@gmail.com)

THE GIST

To begin with, scientists digitised geographical information from birds kept in museums. Then they visited sites where historical surveys took place. Using this methodology, they found that the relative abundance of 90% of grassland birds had dropped.

Museums are vital for biodiversity research, especially in India, a global hotspot of species diversity. They preserve historical records of species distributions, help in taxonomic identification, and provide baseline data crucial for conservation, and tracking biodiversity loss over time.

Scientists also used a map made by a British officer. This map was stored as multiple tiles at the British Library and the Tamil Nadu State Archives. The team photographed the map and digitised it. Then they compared the map with satellite images to assess loss of habitat.

Key Analysis:**1. Key Findings of the Study:**

- Grassland birds in the Nilgiris have declined by nearly 90%, with species like the Nilgiri pipit and Malabar lark most affected.
- Grasslands shrunk by 80%, from 993 sq. km in 1848 to 201 sq. km in 2018.
- Surprisingly, forest birds remained relatively stable, due to grasslands being replaced by woody plantations and invasive species.
- The biggest threat identified: lack of recognition of grasslands as an essential ecosystem, with conservation efforts overwhelmingly focusing on forests.

2. Innovative Methodologies:

- Museum Collections: Historical bird specimens provided data on species abundance, dates, and locations.
- Old Maps: Captain John Ouchterlony's 1848 Nilgiri land-use map was digitised and compared with satellite images to assess habitat change.
- Statistical Model (FAMA): Field Abundance–Museum Abundance method used to estimate species decline over time.

3. Significance for Biodiversity Research:

- Offers a long-term perspective often missing from field studies.
- Provides baseline data crucial for climate impact studies, conservation strategies, and tracking shifts in species distribution.
- Reinforces the role of natural history museums as repositories of ecological memory.

4. Challenges Identified:

- Access Issues: Bureaucratic hurdles, lack of digitisation, outdated infrastructure.
- Global Inequities: Many Indian specimens are housed in Western museums, raising questions of ownership and repatriation of knowledge.
- Funding Constraints: Limited resources restrict comprehensive digitisation and research.

Conclusion:

The Nilgiri study highlights how blending historical archives with modern science can uncover hidden dimensions of biodiversity loss. For India—one of the world's megadiverse nations—strengthening museum infrastructure, digitising archives, and recognising grasslands alongside forests in conservation policies are critical. In the era of rapid ecological change, past records are not just relics—they are guides to shaping resilient futures.

UPSC Mains Practice Question

Ques: Explain the ecological consequences of grassland-to-forest transitions in biodiversity hotspots like the Western Ghats. **(150 Words)**

Page : 08 : GS 2: International Relations

Prime Minister Narendra Modi's decision to attend the Shanghai Cooperation Organisation (SCO) Summit in China marks a strategic shift in India's foreign policy stance. After a seven-year hiatus in visiting China and amid strained ties since the 2020 border standoff, the visit and bilateral engagement with President Xi Jinping signal a recalibration of India's approach towards major Eurasian powers in a turbulent geopolitical landscape.

Key Analysis:

1. Key Diplomatic Outcomes:

- India-China thaw: Approval of troop disengagement process along the LAC, fast-tracking of boundary resolution talks, and resumption of direct flights and visas.
- Economic cooperation: Both sides agreed to build ties to "stabilize world trade", despite U.S. tariff pressures.
- RIC optics: Photographs of Modi, Xi, and Putin rekindled **memories of the Russia-India-China trilateral.**

2. Geopolitical Context:

- U.S. tariffs and sanctions on India, along with uncertainty under the Trump administration, nudged India to hedge and diversify partnerships.
- China's outreach, calling for the "Dragon and the Elephant to come together", reflects Beijing's search for stability amid global economic and security pressures.
- India tactically side-stepped contentious issues such as China's support to Pakistan during Operation Sindoor, UNSC reform blockage, and NSG membership hurdles.

3. SCO Declaration Highlights:

- Strong stance against cross-border terrorism, referencing both the Pahalgam attack (India) and Balochistan attacks (Pakistan).
- Consensus on humanitarian crises in Gaza and

Unmistakable shift

India signalled a change in foreign policy stance at the SCO Summit

More than the outcomes, Prime Minister Narendra Modi's decision to visit China for the Shanghai Cooperation Organisation (SCO) Summit was a clear message from the government on a shift in its foreign policy outlook. It has been seven years since Mr. Modi had travelled to China, and his meeting with Chinese President Xi Jinping was their first such bilateral engagement since the military standoff of 2020. It has been three years since Mr. Modi attended the SCO summit, a Eurasian grouping seen as decidedly anti-western. Meanwhile, photographs of the bonhomie between Mr. Modi, Mr. Xi and Russian President Vladimir Putin evoked memories of an inactive Russia-India-China (RIC) trilateral. The bilateral meeting with China saw the two leaders give their approval to the normalisation process initiated in October 2024, leading from troop disengagement along the LAC. The two sides agreed to fast-track the boundary resolution process being discussed by their Special Representatives. They also gave the green light for the resumption of direct flights, visa facilitation, and the building of economic ties to "stabilize world trade". As Mr. Modi committed to "taking forward ties...based on mutual trust, respect and sensitivity", Mr. Xi called for the "Dragon (China) and the Elephant (India) to come together". Such bonhomie was unthinkable even a year ago, and it is clear that it has been driven, in some measure, by the U.S. moves to impose tariffs and sanctions on India, and New Delhi's sense of mistrust about the Trump administration's intentions. This allowed Mr. Modi and his delegation, for the moment, to side-step some of the concerns India has had over China's actions, including its support to Pakistan during Operation Sindoor, the blocking of Indian moves on UNSC reforms and NSG membership, and holds on designating Pakistan-based terrorists.

It was significant that the Tianjin declaration included strong language against the "cross-border movement of terrorists", albeit condemning the Pahalgam attack and attacks in Balochistan against Pakistani forces, in equal measure. The declaration also saw the entire SCO membership find common ground on contentious issues such as the humanitarian crisis in Gaza, and condemnation of U.S.-Israeli strikes on Iran, although India maintained its opposition to the paragraph supporting China's Belt and Road Initiative. Mr. Xi's plans for an SCO Development Bank, and Mr. Modi's suggestion of initiating a "Civilisational Dialogue" between SCO members found mention. While the outcomes and the optics made for what Mr. Modi described as a "productive" visit to China, his itinerary missed some opportunities for closer engagement with leaders from India's neighbourhood and the Global South, as he skipped the "SCO Plus" Summit.

condemnation of U.S.-Israeli strikes on Iran.

- India continued its opposition to the Belt and Road Initiative (BRI), highlighting sovereignty concerns.
- Endorsement of Xi's proposal for an SCO Development Bank and Modi's call for a Civilisational Dialogue.

4. **Limitations and Missed Opportunities:**

- Modi skipped the "SCO Plus" Summit, reducing chances of wider engagement with neighbouring and Global South leaders.
- Persistent mistrust with China remains unresolved despite optics of bonhomie.
- Balancing Eurasian alignments with India's strategic partnerships with the U.S. and QUAD will remain a delicate act.

Conclusion:

India's participation in the SCO Summit in China underscores an unmistakable shift towards pragmatic multi-alignment in foreign policy. While the optics of rapprochement with China and Russia signal a hedging strategy against U.S. unpredictability, India continues to protect its core interests by opposing BRI and emphasizing sovereignty. Going forward, New Delhi's challenge will be to sustain this balancing act—leveraging Eurasian platforms like SCO for strategic depth, while deepening partnerships with democratic coalitions such as the QUAD and G20.

UPSC Mains Practice Question

Ques : Evaluate the significance of the recent India-China bilateral engagement on the sidelines of the SCO Summit for regional stability. **(150 Words)**

Page 08 : GS 3 : Disaster Management

The recent **earthquake in Afghanistan's Nangarhar province**—magnitude 6.3, followed by multiple aftershocks—has claimed over **1,400 lives** and injured more than **3,100**. The tragedy underscores how natural disasters, while unavoidable, need not translate into catastrophic loss of human life and property if **building codes, urban planning, and preparedness measures** are enforced effectively.

Key Analysis:

1. Context and Vulnerability of Afghanistan:

- Afghanistan lies at the junction of the Indian and Eurasian tectonic plates, making it one of the most seismically active regions in the world.
- Since 1900, the region has experienced at least 12 earthquakes above magnitude 7.
- Recent disasters: Herat (2023) quake killed over 1,500 and destroyed 63,000+ homes.
- Challenges: Taliban regime under sanctions, limited international aid, and weak institutional capacity hinder disaster response.

2. Comparative Perspective:

- Delhi (2025): Magnitude 4 quake at shallow depth but no casualties, reflecting stronger infrastructure.
- Chile: Frequently experiences >6 magnitude earthquakes but reports minimal damage due to strict enforcement of earthquake-resistant building codes.
- This contrast highlights the decisive role of human preparedness and governance rather than seismic force alone.

3. Why Building Codes Matter:

- Properly designed structures can withstand significant tremors, reducing deaths from building collapse—the leading cause of earthquake fatalities.
- Enforcing zoning laws, retrofitting older buildings, and community awareness are equally critical.

Buried in rubble

Earthquakes need not be deadly if building codes are followed strictly

Afghanistan reeled on Monday in the wake of a strong earthquake and multiple aftershocks, killing over 1,400 people, and injuring at least 3,100. According to the United States Geological Survey, the primary tremor was an earthquake of magnitude 6.3 and had struck near Jalalabad, Nangarhar province. After the first tremor, of magnitude 6.3, at a depth of eight kilometres, another earthquake, of magnitude 4.7, struck around 140 km from the epicentre of the initial tremor. The impact of the disaster is playing out in the Kunar and Nangarhar provinces where rescue efforts are on to find and extricate survivors and locate bodies that are buried under piles of rubble. What makes the salvage operations particularly challenging are the limited resources available to authorities given that the ruling Taliban regime faces multiple sanctions. This has been particularly stark following the withdrawal of the United States from Afghanistan in 2021. The United Nations and international humanitarian agencies have voiced their condolences and expressed support to aid the wounded and assist with relief operations.

Afghanistan, which abuts the Hindu Kush mountains, and is at the junction of the Indian and Eurasian tectonic plates, lives under the constant threat of an earthquake. Since 1900, there have reportedly been 12 earthquakes with a magnitude greater than 7 in north-east Afghanistan. In October 2023, the western Herat province was devastated by an earthquake of magnitude 6.3, and several aftershocks, which killed more than 1,500 people and damaged or destroyed more than 63,000 homes. Given the vulnerability of the region, it also bears out that earthquakes of this magnitude and epicentre-depth cause much less damage to lives and property in several parts of the world. Delhi, in February 2025, reported a quake of magnitude 4, at a relatively shallow – and, therefore, potentially more devastating – depth of five kilometres below the surface. True, a quake of magnitude 6 is roughly 100 times more powerful than a one of magnitude 4 assuming similar depths of origin, but there was no physical damage at all reported anywhere in Delhi. At the other end, Chile is regularly besieged by quakes greater than a magnitude of 6, with all accounts suggesting minimal infrastructural damage and no attributable casualties. This is due to the country's focused commitment to enforcing building codes. Earthquakes need not be a death sentence and Afghanistan must take decisive steps to strengthen its building codes and work to spread awareness on their enforcement.

- Examples: Japan and Chile's engineering standards serve as global benchmarks.

4. **Policy Imperatives for Afghanistan:**

- Drafting and implementing context-specific building codes.
- International collaboration for capacity building and technology transfer.
- Community-level preparedness, including earthquake drills, early-warning systems, and safe evacuation protocols.
- Mobilising international humanitarian assistance despite political challenges with the Taliban regime.

Conclusion:

Afghanistan's recurring earthquake tragedies reveal that natural hazards become disasters when human systems are weak. While seismic activity cannot be prevented, enforcing building codes, strengthening institutions, and spreading public awareness can drastically reduce casualties. The Afghan case serves as a sobering reminder that resilience lies not just in survival but in preparedness and governance.

UPSC Prelims Practice Question

Ques: Which of the following countries is well-known for enforcing strict earthquake-resistant building codes, thereby minimizing casualties despite frequent seismic events?

- (a) Chile
- (b) Nepal
- (c) Afghanistan
- (d) Turkey

Ans : (a)

UPSC Mains Practice Question

Ques: Discuss the role of building codes and disaster preparedness in mitigating earthquake-related casualties. What lessons can India learn from global experiences such as Chile and Japan in strengthening earthquake resilience? **(150 words)**

India's power distribution sector faces chronic financial stress, with distribution companies (DISCOMs) routinely running losses due to the gap between the Average Cost of Supply (ACS) and Annual Revenue Requirement (ARR). To temporarily address these shortfalls, State Electricity Regulatory Commissions (SERCs) allow DISCOMs to create regulatory assets—deferred costs to be recovered later from consumers. Recently, the Supreme Court directed SERCs and DISCOMs to clear existing regulatory assets within four years, cap them at 3% of ARR, and ensure transparent recovery timelines, highlighting the urgent need for financial discipline in the sector.

Decoding the SC order on regulatory assets

What are regulatory assets and how are they used by DISCOMs to defer costs? What is the difference between a DISCOM's Annual Revenue Requirement and Average Cost of Supply? Do regulatory assets prevent DISCOMs from modernising the grid? What should be the way forward?

EXPLAINER

Rishu Garg

The story so far:

The Supreme Court recently directed State Electricity Regulatory Commissions (SERCs) and distribution companies (DISCOMs) to clear existing regulatory assets within four years and liquidate any new assets within three years. The court also advised capping the regulatory asset at 3% of a DISCOM's Annual Revenue Requirement (ARR) and instructed regulators to set out transparent roadmaps for recovery, along with conducting intensive audits of DISCOMs that continue without recovering these assets.

What are regulatory assets?

Regulatory assets constitute the unrecoverable revenue gap due to the difference between the Average Cost of Supply (ACS), the expense incurred by a DISCOM to deliver a unit of electricity to consumers, and the ARR, which is the revenue collected by the DISCOM as consumer tariffs and subsidy payments from the government. If the ACS is greater than the ARR, the DISCOM effectively makes a loss on the sale of every unit of electricity. For instance, if a DISCOM's ACS is ₹7.20/unit and ARR is ₹7.00/unit, the gap is ₹0.20 per unit. If the DISCOM supplies 10 billion units, the total shortfall is ₹2,000 crore. To avoid suddenly burdening consumers with an immediate tariff increase to recover the gap, SERCs allow the DISCOM to record the gap as a regulatory asset. This is essentially a deferred cost that the DISCOM is entitled to recover from consumers in the future, usually with interest.

What explains the ACS-ARR gap?

Non-cost reflective tariffs, delays in the release of subsidies (for agriculture or low-income households) by State governments, and sudden increases in



FILE PHOTO

fuel prices (leading to increased power purchase costs) are some of the reasons that contribute to this gap.

The Punjab SERC provides one of the earliest documented cases of regulatory assets in India when it identified a revenue gap of ₹487.10 crore. Of this, ₹150 crore was converted into a regulatory asset, to be recovered over two years: FY 2004-2005 and FY 2005-2006. The remainder, ₹337.10 crore, was allowed to be recovered immediately via tariffs in FY 2003-2004. The Delhi ERC's true-up of FY 2022-23 and ARR for FY 2024-25 order mentioned a regulatory asset of ₹36,057 crore for BSES Rajdhani and ₹22,040 crore for BSES Yamuna, apart from a closing revenue gap (including carrying cost) of ₹8,226.87 crore for Tata Power Delhi Distribution Ltd. In Tamil Nadu, regulatory assets reported in FY 2021-2022 were ₹89,375 crore, indicating

the issue is systemic, reflecting financial pressures across many State DISCOMs.

How are consumers affected?

If the regulatory assets reported by BSES Rajdhani, BSES Yamuna, and Tata Power, the DISCOMs operating in Delhi, are to be recovered within the four-year window set by the Supreme Court, they need to recover about ₹16,580 crore a year. With Delhi's annual electricity consumption of 30 billion units, this works out to an additional ₹5.5 per unit on average.

Since consumers can't be burdened with such high and immediate tariff increases, the State employs regulatory assets. However, the immediate benefit of stable tariffs for consumers is eventually offset by steeper increases when the deferred costs are recovered. Since these assets also attract carrying costs, consumers pay the original gap as well as

the additional interest.

For DISCOMs, the persistence of large regulatory assets results in significant cash flow pressures. Because revenue doesn't cover current costs, DISCOMs often struggle to pay power generators on time. Many DISCOMs borrow to bridge the gap, increasing their debt burden. With so much money tied up in unrecovered costs, their ability to invest in modernising the grid, integrating renewable energy, and in better consumer services becomes limited. The result is a vicious cycle in which financially distressed DISCOMs face greater operational challenges, which in turn make it harder to improve efficiency and recover costs on time.

How can ACS-ARR gap be bridged?

One important step is to ensure tariffs are aligned more closely with costs, while using targeted subsidies to protect vulnerable consumers. This ensures the burden is shared transparently rather than hidden in deferred recoveries.

State governments also need to release subsidies on time so that DISCOMs aren't left carrying the financial gap on their books. Automatic fuel cost adjustment mechanisms, such as the fuel and power purchase cost adjustment mechanism, can help tariffs respond quickly to sudden changes in input costs. Regular annual true-up exercises, where projected and actual expenses are reconciled, can prevent the build-up of large backlogs.

Finally, regulatory commissions play a critical role in maintaining discipline. By enforcing limits, ensuring transparency in accounting, and setting clear timelines for recovery, they can ensure regulatory assets remain an exceptional tool rather than a recurring feature. The Supreme Court's intervention is therefore a call for coordinated action and greater financial discipline across the sector, so that electricity remains both affordable for households and sustainable for utilities.

Rishu Garg is a senior policy specialist and heads the Energy Policy and Regulations group at CSTEP.

THE GIST

Regulatory assets constitute the unrecoverable revenue gap due to the difference between the Average Cost of Supply (ACS), the expense incurred by a DISCOM to deliver a unit of electricity to consumers, and the ARR, which is the revenue collected by the DISCOM as consumer tariffs and subsidy payments from the government.

For DISCOMs, the persistence of large regulatory assets results in significant cash flow pressures. Because revenue doesn't cover current costs, DISCOMs often struggle to pay power generators on time.

State governments need to release subsidies on time so that DISCOMs aren't left carrying the financial gap on their books.

Key Analysis:**1. What are Regulatory Assets?**

- Regulatory assets = deferred revenue gaps when $ACS > ARR$.
- Example: If $ACS = ₹7.20/\text{unit}$ and $ARR = ₹7.00/\text{unit}$, $\text{gap} = ₹0.20/\text{unit}$. For 10 billion units supplied, $\text{loss} = ₹2,000 \text{ crore}$. Instead of immediate tariff hikes, SERCs permit this shortfall to be carried forward as a regulatory asset.
- These attract carrying costs (interest), making eventual recovery costlier for consumers.

2. Why Do ACS-ARR Gaps Arise?

- Non-cost reflective tariffs (politically suppressed tariffs).
- Delayed subsidy payments by State governments.
- Fuel cost volatility, raising power purchase costs.
- Example: Delhi DISCOMs hold regulatory assets worth over ₹58,000 crore; Tamil Nadu reported ₹89,375 crore (FY 2021-22).

3. Impact on Stakeholders:

- Consumers: Initially shielded from high tariffs, but face steeper increases later, along with interest burden.
- DISCOMs: Suffer cash flow stress, delayed payments to generators, rising debt, and reduced ability to modernise the grid or integrate renewables.
- Sectoral Health: Creates a vicious cycle—financially weak DISCOMs become operationally inefficient, worsening losses.

4. Do Regulatory Assets Prevent Modernisation?

- Yes. Locked-up finances and debt obligations prevent DISCOMs from investing in smart meters, grid digitalisation, renewable integration, and consumer service upgrades.
- This weakens India's broader energy transition goals.

5. Way Forward:

- Tariff Rationalisation: Ensure cost-reflective tariffs, while protecting vulnerable consumers through direct targeted subsidies.
- Timely Subsidy Release: State governments must honour commitments on time.
- Automatic Cost Pass-Through: Mechanisms like Fuel & Power Purchase Cost Adjustment (FPPCA) should adjust tariffs promptly.
- Annual True-Ups: Regular reconciliation of projected vs actual costs to avoid backlog.
- Regulatory Discipline: SERCs must enforce caps, ensure transparent accounting, and prevent regulatory assets from becoming routine.

Conclusion:

The Supreme Court's intervention on regulatory assets underscores the urgent need to restore financial viability and transparency in India's power sector. While regulatory assets serve as a short-term cushion, over-reliance has deepened the sector's debt trap and delayed reforms. Going forward, aligning tariffs with costs, ensuring timely subsidies, and strengthening regulatory oversight are essential to break the vicious cycle, safeguard consumer interests, and enable DISCOMs to invest in a modern, resilient, and sustainable electricity grid.

UPSC Mains Practice Question

Ques: Explain the difference between the Average Cost of Supply (ACS) and the Annual Revenue Requirement (ARR). Why does the ACS-ARR gap persist in India's electricity distribution sector? **(150 words)**

The Supreme Court to the soldier's rescue

It was with a sense of relief that one read about the Supreme Court of India taking up, *suo motu* following a media report, the case of cadets who have been boarded out of military academies after sustaining severe injuries and disabilities during their training. It has indeed been a travesty of justice that the special needs and requirements of young boys who came forward to serve the nation, and who sustained severe and debilitating injuries, were not fully catered to by the state till now. The Court may like to dig deeper in this issue.

In cases that involve monetary grants and compensation, there is always a conflict between the understanding of the organisation (read bureaucracy) of the lifelong consequences of serious medical infirmities and the reality that extant rules cannot cover all variations of human misfortune sustained in the line of military duty. The two virtues that are needed are flexibility and empathy. Here are two examples that would suffice.

The case of a mother-to-be

In 1989, this writer was a member of the committee that was in charge of the paperwork of an Indian Air Force (IAF) pilot who had died in a flying accident. His wife was expectant that time. According to the rules in force, the family pension for a widow with a living child was almost double that for a lady who did not have children. The rule book was silent on enhanced pension for a widow who was expectant and who would have the child later, and would, thus, require additional financial support within a few months. We spoke to everyone who mattered. Though everyone understood the unique issue, the answer we always got was that "rules are



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The bureaucracy must demonstrate flexibility and empathy in handling issues — in many cases, life-changing — that defence personnel and their families face

rules." We were asked 'to put up a case' to the government for special consideration for the lady. But why should this be a special case? Why should it not be a general rule for any such misfortune? In the event, we did just that and the rules were amended. However, it still took a few years for the change to happen.

When a Governor acted

Two decades ago, an IAF Cheetah helicopter crashed in the Siachen Glacier. Those who have served on the Glacier will know the extreme dangers that are omnipresent in operations at an altitude of 20,000 feet. Unfortunately, one of the pilots died while the other pilot sustained severe head injuries which would have led to his invalidation from service. The family would have suffered severe hardships had it been left to fend for itself outside the cocoon of the IAF. The Commodore Commandant of the helicopter unit contacted the Governor of Chhattisgarh, the State the pilot was from, and the officer's father met him to request that his son be granted a few years of extension till he got better. The Governor, Shekhar Dutt, who had served in the Indian Army and was a former Defence Secretary, responded with gusto and contacted the then Defence Minister, A.K. Antony (2006-14). Mr. Antony ensured the pilot's extension. The pilot got another extension during the tenure of a later Defence Minister, Manohar Parrikar (2014-17). The Government must be lauded for doing its duty to a worthy combatant.

All this raises a series of serious questions. What would have happened had the stars not aligned the way they did? What if the Governor had not been a former serviceman who understood the dangers involved in air operations

in a combat zone and went out of his way to help? Why should the government not be flexible and forthcoming in implementing the rules for the benefit of all defence and security personnel who put themselves in harm's way to ensure India's security — and not just in selected cases?

An attitude that must change

These are relevant questions because within 10 days of the media article highlighting the travails of the disabled cadets and the Supreme Court having taken *suo motu* notice, the government, on its own volition, acted. It granted these cadets medical benefits that are on a par with benefits given to ex-servicemen.

The cold fact is that over the years, there have been a number of media reports highlighting the plight of injured and disabled cadets and their difficulties that their families face. Yet, the bureaucracy has remained unmoved. The bureaucracy needs to answer tough questions by the higher judiciary about a heartless attitude.

The bureaucracy also needs to be made aware of the 'George Fernandes solution' when it was procrastinating on the purchase of snow scooters. George Fernandes, the then Defence Minister (1998-2001) sent the bureaucrats to Siachen to make them understand why the jawans needed the snow scooters there.

The bureaucracy should also have a look at Chanakya's timeless quote on a soldier's dues (paraphrased here so that the medical needs of soldiers are addressed with empathy) — 'the day the soldier has to demand his dues will be a sad day for Magadha, for then, on that day, you will have lost all moral sanction to be King'.

It is time for the 'King' to act now — in full measure.

GS. Paper 04 - Ethics

UPSC Mains Practice Question: “You are a senior officer in the Ministry of Defence tasked with handling cases related to compensation and welfare of cadets and soldiers injured during training or operations.

Recently, a group of cadets who were boarded out of military academies due to severe training injuries approached your office. They have been struggling financially as existing rules do not grant them the same medical and pensionary benefits as ex-servicemen.

The cadets and their families argue that they were injured while preparing to serve the nation, and therefore deserve the same dignity and support as serving soldiers. However, the bureaucracy cites that “rules are rules” and no such provision exists in current regulations.

At the same time, the media has taken up the issue and the Supreme Court has initiated suomotu proceedings, directing reforms and equal treatment for disabled cadets. You are under pressure to draft a policy note for your Ministry that balances fairness, legal constraints, financial implications, and morale of the armed forces.

Questions

1. Identify the ethical issues involved in this case.
2. What values should guide your decision-making as a civil servant in this scenario?
3. Analyse the conflict between rigidity of rules and humanitarian considerations in this case.
4. Suggest a framework/policy solution that ensures justice for injured cadets while balancing administrative and financial constraints.
5. If you were in charge, how would you ensure that bureaucratic apathy does not lead to such injustices in future?

Context :

The Supreme Court's suo motu intervention in the case of cadets boarded out of military academies due to training-related disabilities marks a watershed moment in recognising the sacrifices of India's future soldiers. For long, these young cadets — who put their lives and limbs on the line during rigorous training — have been denied adequate medical and financial support, leaving them and their families in distress. The Court's proactive role underscores the importance of empathy and flexibility in governance, especially in matters concerning the armed forces.

Core Issues Highlighted

1. Rigid Rules vs. Human Suffering

- Existing pension and compensation frameworks often fail to account for exceptional cases, as seen in the 1989 incident of the expectant widow of an IAF pilot.
- The bureaucracy tends to cite "rules are rules," leading to delays or denials of support until ad hoc interventions are made.

2. Ad-hocism in Relief Measures

- Instances such as the Siachen crash, where relief was possible only due to the intervention of a sympathetic Governor and Defence Ministers, reveal that justice often depends on individual goodwill rather than systemic mechanisms.

3. The Bureaucratic Mindset

- Despite repeated media reports on disabled cadets, bureaucratic inertia persisted for years.
- The military's unique risks are often not internalised by civilian structures, leading to indifference towards soldiers' hardships.

Significance of the Supreme Court's Intervention

- By equating the benefits of disabled cadets with ex-servicemen, the Court has closed a long-standing gap in justice.
- This intervention highlights the judiciary's role as a protector of equity and fairness when the executive falters.
- It also sends a strong signal to the bureaucracy that rigidity cannot override empathy when national security and soldiers' welfare are concerned.

Way Forward

1. Policy Reform

- The government must institutionalise flexible frameworks for compensation and rehabilitation of disabled cadets and personnel, avoiding case-by-case exceptions.

2. Bureaucratic Sensitisation

- Exposure visits, like George Fernandes' initiative of sending officials to Siachen, should be revived to instil empathy in decision-making.

3. Judicial Oversight and Accountability

- The judiciary must continue to question bureaucratic inaction in cases concerning soldiers' welfare.

4. Moral Responsibility of the State

- Drawing from Chanakya's maxim, the State must ensure that soldiers and cadets never have to demand their dues — support should be automatic and dignified.

Conclusion

The Supreme Court's intervention has rekindled hope for justice for disabled cadets, but it also exposes systemic flaws in India's approach to military welfare. A nation that expects supreme sacrifice from its soldiers cannot afford bureaucratic apathy or rigid application of rules. To uphold the moral sanctity of governance and national security, India must adopt a framework rooted in empathy, flexibility, and proactive care for those who serve.
