

Mains Master

A new high: On the Aditya-L1 mission and ISRO outreach

Mission Magnificence:

- **Destination L1:** Aditya-L1's orbit around the L1 Lagrange point, roughly 1.5 million km from Earth, grants an unhindered view of the Sun for five years. This "sweet spot" balances gravitational forces, minimizing fuel needs.
- **Seven Solar Sleuths:** Its arsenal includes:
 - **VELC:** a coronagraph to explore the Sun's fiery outer atmosphere.
 - **SUIT:** an ultraviolet telescope to peek at solar flares and active regions.
 - **SoLEXS and HELIOS:** solar detectives tracking explosive flares and colossal coronal mass ejections.
 - **ASPEX and PAPA:** plasma sleuths studying the solar wind's charged particles.
 - **Digital Magnetometers:** mapping the magnetic field around the spacecraft.

Building on a Legacy:

- Aditya-L1 extends India's storied solar observation, dating back to 1901 with the Kodaikanal observatory.
- It follows the XPoSat mission (X-ray polarimetry) and AstroSat, showcasing India's diverse space capabilities.

Beyond the Data:

- **Bridging the Gap:** Public perception may need a nudge. While Aditya-L1 and AstroSat are groundbreaking for India, comparing them to James Webb, a collaborative effort of three space agencies, is like comparing apples and oranges.
- **Amplifying the Reach:** ISRO can expand public outreach through:
 - **Open days:** Mission-specific events to delve deeper into Aditya-L1 and ignite public interest.
 - **Science communication:** Regular updates and explanations of discoveries in digestible formats.

- **Mission components:** Designing elements specifically to capture public imagination.

Challenges and Opportunities:

- **Funding:** Public excitement about ISRO's recent successes could pave the way for increased funding, fueling further outreach efforts.
- **Collaboration:** Leveraging partnerships with universities, schools, and science communicators can amplify outreach impact.

A Brighter Future:

Aditya-L1 is not just a spacecraft; it's a leap forward for Indian solar science. By unveiling the Sun's secrets, it holds the potential to transform our understanding of space weather, impacting technology and communication. But the true impact lies in connecting with the public, inspiring future generations to reach for the stars. Through effective communication and outreach, ISRO can ensure that Aditya-L1's journey illuminates not just the Sun, but also the hearts and minds of people, igniting a passion for discovery that knows no bounds.

Rise in child marriages in West Bengal

Context

This article highlights the persistent challenge of child marriage in India, especially in states like West Bengal, Bihar, Uttar Pradesh, and Maharashtra. Despite policy interventions and educational advancements, the practice remains a critical concern, impacting maternal and child health. While initiatives like Kanyashree Prakalpa aim to deter child marriage, their effectiveness faces scrutiny due to the high incidence rates. Additionally, weak law enforcement, social biases, migration, and a lack of comprehensive grassroots campaigns continue to perpetuate this issue. The article underscores the need for a holistic approach involving education, law enforcement, and community engagement to effectively combat child marriage and safeguard the rights and well-being of young girls.

Key Findings:

- Overall decrease in child marriage in India, but concentrated in certain states (Bihar, West Bengal, Uttar Pradesh, Maharashtra).
- One in five girls in India still married below legal age.
- West Bengal witnessed a significant absolute increase in child marriages.

Impact:

- Child marriage affecting maternal and child health; linked to instances of infants born with extremely low birth weight.
- Murshidabad, an economically poor district in West Bengal, faces higher instances of child marriages and infant mortality.

Policy Interventions:

- Kanyashree Prakalpa: A cash transfer scheme aimed at incentivizing girls' education and discouraging child marriage, covering 81 lakh girls.
- Questions raised on the scheme's effectiveness despite increased school enrolment among girls.

Challenges & Contradictions:

- Despite strides in educational attainment, child marriage rates remain high.
- No direct correlation between literacy rate and child marriage.
- Migration and workforce dynamics contribute to the persistence of child marriage.

Implementation of Laws:

- Issues with implementing laws on child marriage: fewer cases registered in West Bengal compared to states with lesser instances of child marriage.

Future Outlook:

- Despite policy interventions and laws, challenges persist due to inadequate social campaigns, lack of political will, and enforcement of existing laws at the grassroots level.

Why did the Islamic State attack Iran?

Context

The summary highlights tensions between Iran and the Islamic State (IS). The IS sees Iran as an ideological rival and enemy, while Iran views the IS as a security threat, notably seen in recent deadly bombings in Kerman.

- The Islamic State (IS) claimed responsibility for the bomb attacks at a memorial event in Kerman for Qassem Soleimani, the Iranian General killed by the U.S. in January 2020.
- The attack, which killed at least 84 people and injured over 200, is the third major attack claimed by the IS in Iran, highlighting the growing threat of terrorism Tehran is facing.
- The IS targets Iran due to ideological rivalry, viewing Iran as a battlefield enemy and a Shia theocracy.
- Iran sees the IS as a bid to revive the deadly conflict between Sunnis and Shias and as an immediate security threat.

- Iran has fought the IS through Shia mobilization units and played a critical role in defeating the IS's physical structures.
- Qassem Soleimani, the commander of the Quds Force, was instrumental in shaping Iran's forward defense doctrine and building regional strength through a network of Shia militia groups across West Asia.
- The attack on the memorial event near Soleimani's qabar in Kerman points to Iran's growing security vulnerabilities and the IS's expanding capabilities.
- It comes at a time when Iran is under increasing regional pressure, facing traditional external security threats and a growing internal security threat simultaneously.

How has Red Sea trouble impacted India?

Impact on Indian Trade:

- Houthi militia attacks in the Red Sea force cargo shipping lines to avoid the route, redirecting nearly 90% of western hemisphere cargo from India through the longer Cape of Good Hope route.
- Major shipping lines and feeder vessels cease operations in the Red Sea, leading to significant disruptions in the flow of Indian exports and imports.

Impact on Indian Exports:

- FOB (free on board) contracts place freight burden on buyers, resulting in requests from Indian exporters to hold back consignments due to increased freight costs.
- CIF (cost, insurance, and freight) or C&F (cost and freight) contracts necessitate exporters to bear increased freight costs, affecting the pricing dynamics and leading to delays in shipments.
- Approximately 20-25% of consignments are being held back, particularly impacting low-value, high-volume cargo and perishables.

Impact on Indian Imports:

- Longer transit times and increased costs for imports, with critical imports being assessed for potential cost implications.
- Both import and export cycles elongated, potentially resulting in dearer final products; for example, impacting plans to reduce petrol and diesel prices.

Oil Tanker Impact:

- Freight rates for impacted routes rise due to the crisis, but overall tanker market does not reflect a mass re-routing, suggesting limited impact on the tanker industry.
- Additional war risk premiums in the Red Sea contribute to freight-rate increases, but costs associated with re-routing via the Cape of Good Hope remain higher.

International Response:

- The UN condemns Houthi attacks, stating that no cause or grievance justifies such actions against freedom of navigation in the Red Sea.
- The U.S. calls for more support for 'Operation Prosperity Guardian' to ensure open and threat-free sea lanes.
- India closely monitors the situation, with the Commerce Secretary engaging in discussions with officials and trade bodies.

Why have truck drivers called for a strike?

Overview:

- Truck drivers across India went on strike in January to protest the stricter punishments for hit-and-run cases under the new Bharatiya Nyaya Sanhita (BNS) law.
- The hit-and-run clause (Section 106 (2)) prescribes up to 10 years imprisonment and fine for fleeing accident scenes, whereas the existing penalty under the Indian Penal Code (IPC) is much milder.
- Drivers raised concerns about the steepness of the penalty considering their low wages and lack of proper accident investigation protocol, leading to potential unfairness.
- The government initiated dialogue with transporters' bodies, but tensions remain as some driver associations continue demonstrations, demanding withdrawal of the clause.

Key Points:

- **Clause details:** BNS Section 106 (2) increases the jail term and fine for hit-and-run cases compared to the existing IPC Section 304A. It also omits provisions for medical assistance to injured persons in case of accidents.
- **Driver concerns:** They fear disproportionate punishments due to low wages and inadequate accident investigation practices that might unfairly blame them. They also highlight fatigue due to longer working hours and ergonomic issues in truck cabins.
- **Government response:** The Home Ministry met with transporters' body AIMTC, promising consultations before invoking the new clause and assuring that it has not been implemented yet. However, some driver associations remain unsatisfied.
- **Road accident data:** Hit-and-run cases constitute 18.1% of all road accident deaths in India, and trucks are involved in 9% of these deaths.

Unresolved Issues:

- Lack of direct consultation with driver associations during the BNS formulation.
- Need for proper accident investigation protocols and training for police to address concerns of biased blame towards truck drivers.

- Addressing driver fatigue through regulated working hours and improved cabin ergonomics.
- Incorporating provisions for medical assistance to accident victims in the new law.

Outlook:

- The government needs to address driver concerns through open dialogue and potential amendments to the hit-and-run clause.
- Improved enforcement of traffic regulations and stricter action against overloading and illegal vehicles are crucial.
- Investing in driver training, fatigue management practices, and ergonomic adjustments in trucks can benefit both safety and drivers' well-being.
- Ensuring proper accident investigation and fair implementation of the law is essential to build trust and reduce road accidents.

In conclusion, while the stricter hit-and-run clause aims to deter irresponsible driving and promote victim justice, addressing driver concerns through dialogue, fair implementation, and improved road safety measures is crucial to find a sustainable solution.

GST revenues reveal a dissonance in consumption growth across States

While overall GST revenues are strong, state-wise data reveals a fragmented picture of consumption growth across India, with some states lagging behind the national average.

Key Points:

- **GST revenues:** Overall, GST collections are robust, growing at 11.7% and averaging ₹1.66 lakh crore per month. However, state GST collections show a wider range of growth rates.
- **State disparities:** Eight states, led by Madhya Pradesh, Maharashtra, and Karnataka, are witnessing strong State GST growth ranging from 17% to 18.8%.
- **Lagging states:** Gujarat, West Bengal, Delhi, and Odisha are among the top 10 GST contributors where growth is slower than the national average of 15.2%.
- **Possible reasons:**
 - **Uneven rural demand:** Weaker farm sector performance in states like Odisha, Rajasthan, and Chhattisgarh could be impacting rural consumption.
 - **Lack of wage growth:** India Ratings and Research suggests limited wage growth, especially for lower income households, is hindering broader consumption recovery.

- **Skewed demand:** Consumption growth may be primarily driven by upper income households, neglecting goods and services consumed by lower income groups.

Outlook:

- Uneven consumption patterns across states highlight the need for tailored strategies to bolster demand in lagging regions.
- Improving rural demand through measures like farm sector reforms and rural infrastructure development could be crucial.
- Ensuring broader-based consumption growth requires addressing income inequality and promoting wage growth across all income brackets.




Additional Insights:

- Smaller states and Union Territories, including the North-Eastern states and Jammu & Kashmir, are showing higher State GST growth compared to larger states.
- This may indicate potential for economic expansion in these regions and calls for targeted support to nurture these emerging markets.

Overall, the GST data reflects a complex picture of consumption growth in India. Addressing regional disparities and promoting inclusive economic growth will be crucial to achieving sustainable and robust demand in the future.




Prelims Booster

In a first, IAF C130 with Garud commandos makes night landing at Kargil





-  **Significance of Night Landing:**
 - The first-time night landing at Kargil ALG demonstrates the IAF's ability to conduct specialized missions round the clock in challenging terrains.
 - Kargil ALG, situated at around 10,000 feet altitude, lacks night landing facilities and has a restricted approach surrounded by rough terrain.
- Successful night landing showcases the capability to execute specialized operations in critical areas under adverse conditions.
-  **Strategic Importance:**
 - Kargil ALG is crucial as the sole airstrip in the region, proving vital for exigencies in an area with restricted aerial access.
 - IAF operates from full-fledged airfields in Jammu and Kashmir, while ALGs in Ladakh and near the borders play a significant role.
-  **ALG Upgradation and Expansion:**
 - Defence Ministry's efforts to revive ALGs near the borders, particularly along the Line of Actual Control (LAC) with China.

- Projects include the upgrade of ALGs in Arunachal Pradesh and the development of emergency landing strips on national highways.
- ALG Nyoma near Pangong Tso undergoing conversion into a full runway capable of handling fighter jets, expected to be completed by 2025.
- ALG Daulat Beg Oldi, at an altitude of 16,700 feet, holds critical importance for aerial connectivity to the Sub-Sector North.

Digital tools set to save Kashmiri script

-  **Historical Decline:**
 - Kashmiri language's written script knowledge fell to 5% by 2013, limiting literature accessibility.
 - Lack of formal teaching resulted in a generation unable to write or read in Kashmiri.
-  **Tech Giants' Initiative:**
 - Microsoft's MS Translator and Google Translate set to include Kashmiri, benefiting 70 lakh speakers in Jammu and Kashmir and Pakistan Occupied Kashmir (PoK).
 - Amin Bhat from Adbee Markaz Kamraz (AMK) lauds Microsoft and Google for aiding language preservation and enhancing literature outreach.
-  **Cultural Promotion:**
 - AMK's campaign drove 17,000 requests to Google, urging Kashmiri inclusion in translation apps.
 - Efforts by Radio Kashmir, cultural academies, and singers contributed to language preservation through folk music.

Study reveals the oldest evidence of photosynthesis

-  **Discovery:** Catherine Demoulin and colleagues discovered 1.75-billion-year-old microfossils exhibiting evidence of thylakoids, shedding light on the evolution of oxygenic photosynthesis.
-  **Thylakoids:** Membrane-bound structures found in chloroplasts of plants and some cyanobacteria, found within Navifusa majensis fossils from Australia's McDermott Formation, suggesting potential evolution of photosynthesis before 1.75 billion years ago.
-  **Oxygen Evolution:** While not conclusive on the timing of photosynthesis emergence, the discovery emphasizes the need for further analyses of older microfossils to understand thylakoid evolution and rising oxygen levels during the Great Oxidation Event.
-  **Metabolic Activity:** Thylakoids offer direct evidence of oxygenic photosynthesis metabolism, indicating the presence of metabolically active vegetative cells rather than dormant stages, extending the fossil record of thylakoid-bearing cyanobacteria by 1.2 billion years.