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FOR UPSC CIVIL SERVICE EXAMINATION

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1. Coming Oil Price Shock: Is India Prepared?

1. Strategic Importance of the Strait of Hormuz

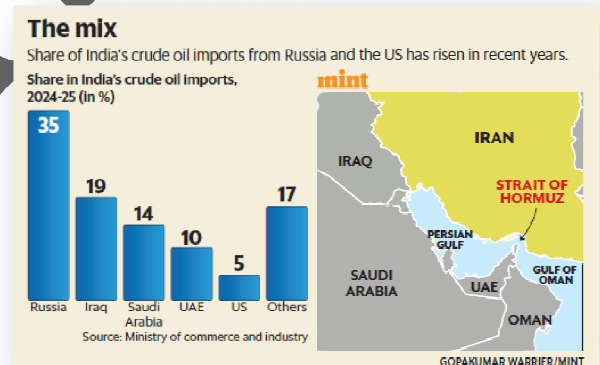
- **Definition:** The Strait of Hormuz is a narrow waterway connecting the Persian Gulf with the Gulf of Oman and Arabian Sea.
- It is the world's most critical oil chokepoint—**around 20% of global oil production** transits through it daily.
- Following US airstrikes on Iran's nuclear facilities, Iran's Parliament has voted to **close the strait**, though the final decision lies with Iran's Supreme National Security Council.

2. Likelihood of Iran Closing the Strait

- Historically, Iran has **avoided closing the Strait** since **96% of its own oil exports** pass through it.
- However, with Iran facing **severe military setbacks**, **proxy allies weakened**, and the regime under existential threat, the risk of a closure is **now higher than ever** despite potential self-damage.

3. Implications for India

- India imports **40% of its crude oil through the Strait of Hormuz**, about **2 million barrels per day**.
- A closure will cause a **supply disruption** and **price shock**, with Brent crude possibly rising to **\$100/barrel**.
- Economic impacts may include:
 - **Inflationary pressure**
 - **Slowdown in consumption revival**
 - **Lower GDP growth** (Bank of Baroda predicts a 20 basis points hit if oil averages \$80 per barrel annually)



4. India's Preparedness Measures

- India is the **third-largest oil consumer and importer** globally.
- **Diversification of sources** has been ongoing:
 - **Russian imports** rose to 2.2 million barrels/day (more than combined West Asian imports).
 - **US imports** also increased.
 - **West Asia's share** has declined significantly.
- India has **strategic petroleum reserves (SPR)** that can be tapped during short-term disruptions.

5. Global and Diplomatic Dimensions

- Brent crude surged to **\$81/barrel**, a 5-month high, post-conflict.



- The US has **warned Iran** and **engaged China diplomatically**—as China is a key importer via Hormuz.
- Disruption could trigger **geopolitical realignments** and **energy security collaborations** globally.

Additional Key Points for UPSC

- **Energy Security** is a critical aspect under **GS Paper 3 (Economic Development, Infrastructure)**.
- India's **Strategic Petroleum Reserve Policy** falls under the Ministry of Petroleum and Natural Gas.
- **Energy diplomacy** involving nations like Russia, the US, and Gulf states has strategic implications.
- **Article 51 of the Indian Constitution** encourages promotion of international peace and security—relevant in the context of India's balanced diplomacy in energy geopolitics.

Conclusion

India faces a credible oil price shock risk due to rising geopolitical tensions in West Asia, particularly around Iran and the Strait of Hormuz. While India's diversification strategy and strategic reserves offer some insulation, sustained high crude prices can derail economic recovery. Hence, **strengthening energy diplomacy, increasing strategic reserves, and accelerating domestic energy alternatives** like biofuels and renewables are essential long-term imperatives for India's energy and economic security.

2. Eight Years of GST in India: Industry Perspective

1. Overview of the GST Regime in India

- **Definition:** Goods and Services Tax (GST) is a unified indirect tax system that replaced multiple central and state taxes in India from **1st July 2017**.
- **Objective:** To simplify the indirect tax structure, eliminate cascading taxes, and create a common national market.
- **Constitutional Provision:** Introduced via the **101st Constitutional Amendment Act, 2016**; empowered both Centre and States to levy GST.

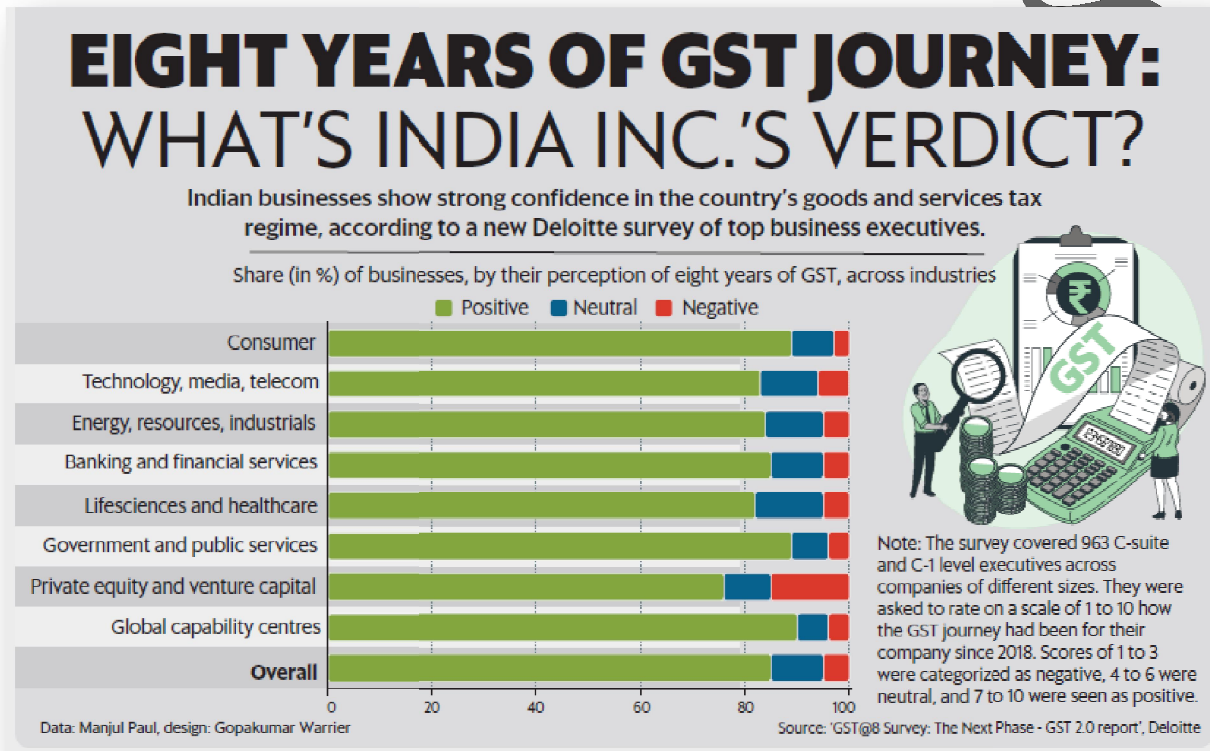
2. Business Sentiment After 8 Years of GST

- As per the **Deloitte survey of 963 C-suite and C-1 level executives**, most Indian companies have shown **positive sentiment** towards the GST regime:
 - **Positive Rating (7–10):** Majority across all major sectors
 - **Neutral (4–6):** Moderate number of companies still adapting
 - **Negative (1–3):** Very few, indicating a decline in dissatisfaction
- **Sectors most satisfied:** Consumer goods, telecom, industrials, and global capability centres
- **Sectors still adapting:** Some challenges noted in public services and healthcare sectors



3. Key Achievements of GST

- **One Nation, One Tax:** Unified national market with seamless inter-state trade
- **Improved Compliance:** Use of **GSTN portal** has enabled real-time tax filing and tracking
- **Revenue Growth:** GST collections have consistently risen, indicating better tax buoyancy
- **Curbing Tax Evasion:** Input Tax Credit (ITC) mechanism and e-invoicing have improved transparency



- **Digital Transformation:** Encouraged digitisation among small and medium enterprises (SMEs)

4. Challenges Still Faced

- **Rate Rationalisation:** Multiple tax slabs (5%, 12%, 18%, 28%) complicate the system
- **Compliance Burden:** Frequent changes in rules and tech glitches in GSTN portal affect MSMEs
- **Delay in Refunds:** Especially for exporters and input-heavy sectors
- **Coordination Issues:** Between Centre and States in GST Council decisions, though the Council is a federal cooperative body under **Article 279A**

5. Legal & Institutional Provisions

- **GST Council (Art. 279A):** Constitutional body to make recommendations on tax rates, exemptions, and model laws



- **CGST Act, SGST Acts, IGST Act, UTGST Act:** Define the legal framework for GST implementation
- **Article 246A:** Provides concurrent powers to Centre and States to legislate on GST

Conclusion

Eight years into implementation, **India Inc. broadly views the GST regime as a success**, with rising compliance, improved transparency, and streamlined indirect taxation. While operational and structural challenges remain—particularly for small enterprises and complex sectors—continuous reforms, digital improvements, and stakeholder consultations can enhance GST's effectiveness.

3. India's Fertility Decline: Hidden Realities and Policy Implications

1. Fertility Rate Below Replacement Level

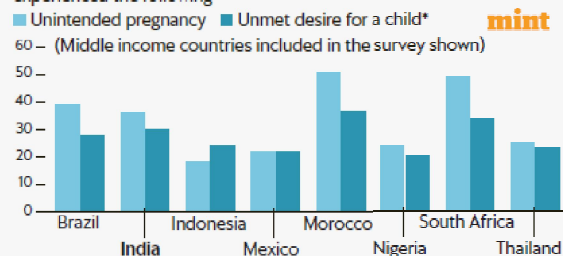
- **Definition:** *Total Fertility Rate (TFR)* refers to the average number of children a woman would have over her lifetime.
- According to the **2025 UNFPA report**, **India's TFR has fallen to 1.9**, below the **replacement level of 2.1** since 2020.
- Causes include: increased education levels, rising urbanisation, delayed marriages, better access to contraception, and evolving economic aspirations.

2. Barriers to Parenthood in India

- Major barriers preventing couples from achieving desired family size:
 - **Financial constraints (40%)**
 - **Housing issues (22%)**
 - **Job insecurity (21%)**
 - **Lack of spousal involvement in childcare**
 - **Fear of climate change and social instability**
- India faces more severe constraints compared to global averages on 10 out of 14 measured parameters, especially on healthcare access and external pressures during family planning.

About one in three Indians faces hurdles in achieving ideal fertility goals

Share (%) of respondents who said they (or for men, their partners) experienced the following



*Refers to when a couple wanted a child but could not have. Based on an online survey of 14,256 adults across 14 countries between November and December 2024. Source: 'State of World Population 2025' report by United Nations Population Fund

3. Unfulfilled Aspirations and Contradictions



- A paradox exists where **30% of Indians had unintended pregnancies**, while a **similar share wanted children but couldn't conceive**.
- About **1 in 4 Indians** experienced both situations—leading to unplanned family sizes and unmet reproductive goals.
- This reveals systemic gaps in India's reproductive health infrastructure and awareness efforts.

4. Gender-Neutral Constraints on Reproductive Rights

- Around **61% of both men and women** reported facing coercion in reproductive decision-making.
 - **30% of men** vs **26% of women** faced pressure to have a child.
 - **33% of women** and **34% of men** felt unable to refuse sexual intercourse.
- These figures call for inclusive policies that protect **reproductive agency and bodily autonomy** for *all genders*.

5. Positive Developments and Demographic Shifts

- Decline in adolescent births (ages 15–19) significantly contributed to TFR reduction—India outpaced global trends.
- Emphasis on **female education, delayed childbearing, and health empowerment** has played a positive role.
- However, **shrinking fertility** could reduce the window of **demographic dividend** if not complemented by productivity-enhancing measures.

Constitutional & Legal Relevance

- **Article 21 (Right to Life and Personal Liberty)** includes reproductive rights and bodily autonomy.
- India's **National Population Policy (2000)** focuses on promoting reproductive health and family planning.
- India is a signatory to **ICPD (1994)** and **SDG 3 (Good Health and Well-being)**, which stress reproductive rights and gender equality.

Conclusion

India's fertility decline is a complex narrative—not merely a demographic shift, but also a reflection of evolving socio-economic realities, constraints on reproductive rights, and unmet family planning needs. While it signals advancement in female empowerment and adolescent health, the existence of coercion, structural barriers, and unmet aspirations highlights the need for a **rights-based, gender-neutral, and inclusive reproductive health policy**.

4. India's Oil Plan B Amid West Asia Crisis

1. Background: Rising Geopolitical Tensions in West Asia

- Iran launched **missile strikes on US bases in Qatar and Iraq**, escalating regional tensions.



- The situation follows Israel's strike on Iran (13 June), raising fears of wider conflict.
- Iran has *threatened to block the Strait of Hormuz* — a vital global oil chokepoint that handles **1/5th of global crude oil**.
- Historical note: The Strait remained open even during the **Iran-Iraq war (1980s)**.

2. India's Plan B: Multi-Source Oil Security

- India imports **5.5 million barrels/day**, with **1.5–2 million barrels** passing through the Strait of Hormuz.
- **Plan B includes:**
 - Diversifying import sources (**39 countries**).
 - Leveraging **Strategic Petroleum Reserves (SPR)** — 75 days of inventory.
 - Increasing procurement from the **US and Russia**.
- India's oil import strategy shows strong preparedness to tackle **supply disruptions**.



3. Economic and Market Impact

- Oil prices have seen a modest rise: Brent crude at **\$77.88/barrel**, WTI at **\$74.75/barrel**.
- **Stock markets** showed volatility but recovered partially.
 - **Sensex** closed down 511 points; **Nifty** down 140 points.
- **Shipping costs** have surged:
 - Freight from West Asia to East Asia increased **150%**, from \$20,000 to \$50,000 per vessel.
 - Rise in **landed oil costs** could raise **fertilizer subsidy** burden (□ 1.68 trillion for FY26).

4. Expert View: Temporary Disruption Expected

- According to economists (e.g., Deloitte India), the disruption is expected to be **short-lived**.
- The **US may increase supply** from domestic reserves to bridge demand gaps.
- While India's **Current Account Deficit (CAD)** impact may be muted, **investor sentiment** could suffer due to **capital flight risks** in emerging markets.

5. Strategic Importance of the Strait of Hormuz

- **Definition:** A narrow maritime chokepoint connecting the Persian Gulf with the Gulf of Oman and Arabian Sea.
- Carries about **21 million barrels/day** — over **20% of global consumption**.



- Any closure would affect **Asian countries disproportionately**, including India, Japan, South Korea, and China.

Constitutional & Legal Relevance for UPSC

- **Energy security** is a part of **national security strategy** (GS Paper III).
- **Article 21** (Right to Life) indirectly supports uninterrupted energy access for essential services.
- India's **Strategic Petroleum Reserve Policy** is under the **Ministry of Petroleum and Natural Gas**.
- India's response also reflects principles of **economic diplomacy** and **strategic autonomy**.

Conclusion

India's proactive Plan B for oil imports showcases a **resilient and diversified energy strategy** in the face of heightened geopolitical risk in West Asia. While the closure of the Strait of Hormuz remains unlikely, rising freight costs, oil prices, and investor uncertainties could have short-term economic impacts.

5. Rising Israel-Iran Tensions and Their Impact on India's Agricultural Exports

1. Strategic Importance of Iran for Indian Agri Trade

- India's agricultural exports to Iran stood at **\$1.24 billion in 2024–25**, with **Basmati rice alone accounting for \$753.2 million**.
- Other major agri-exports: bananas, tea, Bengal gram, soybean meal.
- **Iran is a key trade partner**, especially through **Bandar Abbas port**, a crucial gateway for Indian exports to **Afghanistan and Central Asia**, bypassing Pakistan.

2. Current Conflict and Disruption Risks

- Rising **Israel-Iran conflict** threatens:
 - Trade routes through the **Gulf and Hormuz Strait**.
 - **Shipping delays and insurance cost hikes**.
 - **Tighter payment mechanisms** due to US sanctions on Iran.
- **Perishable goods** like rice, bananas, and tea are at **high risk** due to shipment delays.
- Nearly **100,000 tonnes of Basmati rice exports to Iran are stranded**, while **₹1,500 crore in dues** remain unpaid.

3. Ripple Effects on Broader Trade

- Though India's **direct sugar exports to Iran are minimal**, sugar shipments to **Afghanistan (via Iran)** face disruption.
- **Edible oil prices** jumped by **\$40–50/week** due to energy cost hikes and supply chain strain.



- **Freight and operational risks** in the Gulf could increase landed cost and reduce competitiveness of Indian agri-products.

4. Chabahar Port: Strategic Alternative

- Experts underline the need to urgently **operationalize and scale up the Chabahar Port** as a **secure alternative** to Bandar Abbas.
- **Chabahar Port** is crucial to India's connectivity with:
 - **Afghanistan and Central Asia**
 - **International North-South Transport Corridor (INSTC)**
- Unlike Bandar Abbas, Chabahar is **less exposed to tensions** in the Gulf and avoids Pakistani territory.

5. Policy and Economic Implications

- India's **Look-West Policy** and **Act East Policy** both require **robust and stable trade corridors**.
- Escalating tensions highlight India's **vulnerability to geopolitical disruptions** in critical maritime chokepoints.
- A **national strategy** to diversify export routes and strengthen payment mechanisms is vital for agricultural and trade resilience.



Constitutional & Legal Relevance

- **Article 301–307** of the Indian Constitution governs **freedom and regulation of trade and commerce**.
- **Strategic trade decisions** fall under **Article 73 & 246**, allowing central government to legislate on foreign trade and diplomatic agreements.
- India's participation in **international agreements** (e.g., INSTC) is also rooted in its **foreign policy and strategic autonomy frameworks**.

Conclusion

The Israel-Iran conflict poses significant risks to **India's agricultural exports**, particularly through the **Bandar Abbas corridor**. With perishable goods stranded and payment channels disrupted, the crisis underlines India's urgent need to **scale up the Chabahar port**, diversify its **regional trade infrastructure**, and fortify **logistical resilience**.



6. India's Economic Activity Hits 14-Month High in June

1. Key Finding: PMI at 14-Month High

- As per the **HSBC Flash Purchasing Managers' Index (PMI)** survey, India's **Composite Output Index** rose to **61 in June 2025**, marking the **highest level in 14 months**.
- The **PMI above 50 indicates expansion**, while below 50 signals contraction.
- This sharp rise reflects **strong momentum in both manufacturing and services sectors**, indicating broad-based economic health.

2. What is PMI? (Definition for UPSC)

- **Purchasing Managers' Index (PMI)** is an economic indicator based on monthly surveys of private sector companies.
- It helps gauge **business confidence and performance** in manufacturing and services.
- A **composite PMI** combines both sectors to offer a more comprehensive view of economic activity.

3. Drivers of Growth

- The surge in June was driven by:
 - **Strong goods and services demand**
 - Improved **domestic consumption** and **export orders**
 - Robust **output growth** in manufacturing and service sectors
- This signals **economic resilience**, despite global uncertainties.

4. Policy Relevance & Economic Implications

- Strong PMI signals can influence:
 - **Monetary policy decisions** by RBI
 - **Fiscal policy planning** related to growth and inflation
 - **Investor confidence**, both domestic and foreign
- Reflects well on India's **macroeconomic fundamentals** and could support higher capital inflows.

5. Constitutional and Legal Context

- **Article 246 & 265**: Empower Union and State governments to legislate and levy taxes essential for funding economic recovery.
- **FRBM Act (Fiscal Responsibility and Budget Management Act)**: PMI data indirectly influences fiscal prudence targets and growth assumptions.
- **NITI Aayog & MoSPI (Ministry of Statistics and Programme Implementation)**: Monitor and analyze macroeconomic indicators like PMI for policy direction.



Conclusion

India's economic momentum, reflected in the **14-month high PMI composite score**, signifies a robust post-pandemic recovery, driven by strong performance in manufacturing and services.

7. Expert Panel Set Up for Income Distribution Survey

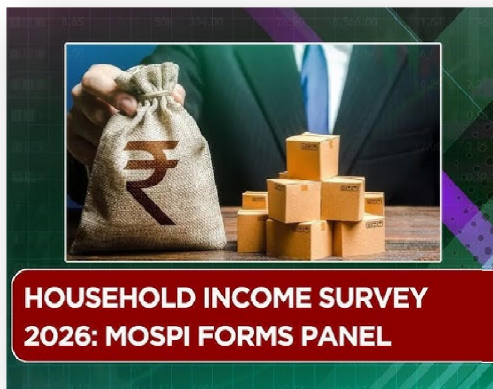
1. Key Development: Expert Group Constituted

- The **Ministry of Statistics and Programme Implementation (MoSPI)** has constituted a **Technical Expert Group** headed by **Surjit S. Bhalla**.
- The panel will advise the **National Statistical Office (NSO)** on the **design and execution of an all-India income distribution survey**, tentatively planned for **2026**.
- The move signals the government's intention to **generate granular and reliable data on household incomes and inequality levels**.



2. Purpose of the Income Distribution Survey

- The survey aims to:
 - Measure **income levels across households and regions**.
 - Assess **income inequality and redistribution trends**.
 - Provide a **comprehensive database** for evidence-based policy-making.
- Current economic data (like consumption expenditure surveys) **does not capture income distribution comprehensively**, hence the need for this new initiative.



3. Significance for Policy and Governance

- Reliable income distribution data is critical for:
 - Designing **targeted welfare programs**.
 - Assessing the **impact of fiscal transfers and subsidies**.
 - Understanding disparities across **caste, gender, region, and occupation**.
- It supports better implementation of **inclusive growth strategies** and helps in **evaluating poverty alleviation efforts**.



4. Constitutional & Legal Framework

- **Article 38(2)** of the Indian Constitution directs the State to **minimize inequalities** in income and opportunities.
- **Article 39(b & c)** under **Directive Principles of State Policy (DPSP)** mandates equitable distribution of material resources and avoidance of wealth concentration.
- The **Collection of Statistics Act, 2008**, empowers the central government to conduct such surveys to inform policy.

5. Institutional Bodies Involved

- **MoSPI**: The nodal ministry responsible for statistical coordination and surveys.
- **NSO (National Statistical Office)**: Executes large-scale statistical operations like the Economic Census, PLFS, and now, this income survey.
- **Surjit Bhalla**: An eminent economist, also associated with global economic advisory roles, lending credibility to the process.

Conclusion

The formation of an expert panel for India's first comprehensive **Income Distribution Survey** is a significant step toward **data-driven governance** and **inclusive economic planning**. It aligns with constitutional mandates for social and economic equity and fills a critical gap in the country's economic statistics.

8. Scaling Up Unified Lending Interface (ULI)

1. Key Development: ULI Coordination Meeting

- The **Department of Financial Services (DFS)** and the **Reserve Bank of India (RBI)** convened a high-level meeting with officials from **central and state governments** to discuss scaling up the **Unified Lending Interface (ULI)**.
- The ULI is envisioned as a **digital lending infrastructure** to streamline and **digitally integrate the credit ecosystem** in India.
- The move is part of the government's larger goal to enhance **financial inclusion** and ease of doing credit business.

2. What is Unified Lending Interface (ULI)?

- **ULI** is a proposed **digital public infrastructure** aimed at creating a **seamless, paperless, and faster credit delivery system**.





- It would connect **lenders (banks, NBFCs)** with various public and private data sources using **API-based integrations**.
- Objective: Reduce paperwork, eliminate duplication, and speed up loan approvals for individuals, MSMEs, and priority sectors.

3. Importance for Economic Governance

- ULI is expected to:
 - **Improve credit access** for underserved sectors, especially **MSMEs and rural borrowers**.
 - Reduce reliance on collateral by leveraging **alternative credit data** (e.g., utility payments, GST returns).
 - Enhance transparency, reduce fraud, and support **responsible lending practices**.
- It supports broader national priorities like **Digital India, Gati Shakti, and Ease of Doing Business**.

4. Constitutional & Legal Framework

- **Article 38**: Directs the State to promote **welfare through economic justice** and minimize inequalities.
- **Article 301**: Ensures **freedom of trade and commerce** across the country, which ULI aims to strengthen through credit access.
- **RBI Act, 1934 and Banking Regulation Act, 1949** empower RBI to regulate credit systems and promote innovation in the financial sector.
- Aligns with **India's Digital Public Infrastructure (DPI)** framework and recommendations of **G-20 Global Partnership for Financial Inclusion**.

5. Institutional Involvement and Stakeholders

- Key stakeholders include:
 - **DFS** (policy and coordination)
 - **RBI** (regulation and technical standards)
 - **State governments, financial institutions, and fintech platforms**
- The initiative reflects **cooperative federalism**, with Centre and States working together to expand access to formal credit.

Conclusion

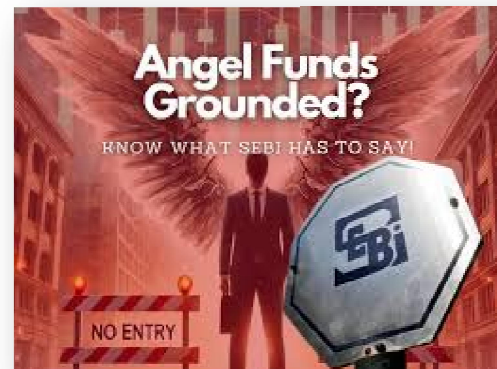
The proposed **Unified Lending Interface (ULI)** represents a major leap in India's efforts toward **digitizing and democratizing credit**. By cutting down bureaucratic delays and enabling real-time credit decisions, ULI can empower **small borrowers, MSMEs, and rural entrepreneurs**, supporting inclusive economic growth. For UPSC aspirants, ULI is relevant for **GS Paper III (Indian Economy, Financial Inclusion, Infrastructure)** and **GS Paper II (Governance & Cooperative Federalism)**, as well as in **Essays on digital governance and inclusive development**.



9. SEBI's New Angel Investor Rules and Their Impact on Startup Funding

1. SEBI's New Mandate for Angel Fund Investors

- As per the **Securities and Exchange Board of India (SEBI)** directive (June 2025), **only accredited investors (AIs)** are now allowed to invest in **angel funds**.
- This marks a shift from the earlier informal eligibility norms for angel investors to a **formal, verifiable accreditation process**.
- Objective: **Enhance transparency, investor suitability, and governance** in early-stage startup funding.



2. Who is an Accredited Investor? (Definition)

- SEBI defines accredited investors as those who meet at least one of the following criteria:
 - Annual income > ₹2 crore, or
 - Annual income > ₹1 crore with net worth > ₹5 crore, or
 - Net worth > ₹7.5 crore.
 - Accreditation is done through registered agencies; certificate valid for **2 years** with a fee of ₹12,000.

3. Impact on Startup Ecosystem

- **Pre-seed and seed-stage startups**, especially in **tier-2 and tier-3 cities**, will face difficulties due to the **shrinking pool of first-time and informal angel investors**.
- Many **non-accredited retail angels** may hesitate or delay entering the formal system, causing a **temporary slowdown in early-stage fundraising**.
- **Syndicates and startup accelerators** will need to revise their investment strategies.

4. Long-Term Advantages and Institutionalization

- In the long run, SEBI aims to:
 - **Attract serious, risk-aware capital.**
 - Eliminate **grey areas** and improve **fund governance**.
 - Encourage the growth of **Alternative Investment Funds (AIFs)** and **Co-investment Vehicles (CIVs)** for regulated, large-scale investments.
- Growth-stage startups are **unlikely to be affected** due to reliance on institutional investors.



5. Constitutional & Legal Framework

- **Article 19(1)(g)**: Ensures the right to practice any profession or carry out any occupation, trade, or business—includes startup entrepreneurship.
- SEBI derives its authority from the **SEBI Act, 1992**, which empowers it to regulate securities markets and protect investors.
- The rules aim to align India's startup financing environment with **global best practices** on investor protection.

Conclusion

SEBI's move to formalize angel fund investments through accredited investor norms may cause **short-term disruption**, especially for early-stage founders in smaller cities. However, it is a **step toward institutionalizing startup finance**, improving **market transparency**, and encouraging **mature capital participation**.

10. Strait of Hormuz Crisis and Its Impact on Global Markets

1. Geostrategic Importance of the Strait of Hormuz

- The **Strait of Hormuz** is a **20-mile-wide** waterway that connects the **Persian Gulf to the Gulf of Oman and Arabian Sea**.
- It is the world's **busiest energy chokepoint**—**~20% of global oil** and a **significant share of LNG (liquefied natural gas)** pass through it daily.
- Any disruption here could have **global implications** on energy prices, trade, and geopolitical stability.



2. Recent Escalation and Iran's Threat

- Iran's **parliament reportedly approved closure** of the strait following **US-backed Israeli strikes** on its nuclear facilities.
- Though final authority rests with Iran's top security officials, this **diplomatic maneuver is seen as a bargaining chip**, not a likely immediate action.
- Oil markets have already reacted—**Brent crude rose by over 3.2%**, crossing \$79/barrel.

3. Strategic and Economic Repercussions

- A full closure could result in:
 - **Global energy crisis** and inflation spikes.
 - Severe blow to **Iran's own economy**, as most of its oil exports pass through the strait.



- Military confrontation involving the **US Navy**, which has historical precedent in escorting tankers during the 1980s Iran-Iraq conflict.

4. Asymmetric Warfare and Maritime Security Risks

- Iran uses **small, fast attack boats, mines, and naval commandos** to assert influence.
- Past incidents:
 - The **2019 seizure of Stena Impero** by Iran's Islamic Revolutionary Guard Corps (IRGC).
 - Use of **swarming tactics and sea mines** as psychological and strategic deterrents.
- This creates persistent **security risk for commercial shipping**, spiking **insurance premiums and freight rates**.

5. Implications for India and Global Economy

- India, being a major oil importer (especially from West Asia), remains highly vulnerable to any such blockade.
- India's **current account deficit, import bill, and inflation** could rise sharply.
- **Stock markets and investor sentiment** globally (and in India) remain jittery due to possible supply chain disruptions.

Key Terms for UPSC

- **Chokepoint**: A narrow passage where maritime traffic is vulnerable to blockade or disruption.
- **Asymmetric warfare**: Military strategies that use unconventional tactics (e.g., mines, small boats, cyberattacks) by a weaker force against a stronger one.
- **Strategic Reserve**: Emergency oil reserves maintained by a country to handle supply shocks.
- **Brent Crude**: A major global oil benchmark used to price two-thirds of the world's crude oil.

Conclusion

The Strait of Hormuz remains a **critical artery for global energy flows**. Iran's threat to close the strait amid ongoing tensions with Israel and the US reflects the **volatile intersection of energy security and geopolitics**. While an actual blockade remains unlikely due to **economic self-harm to Iran**, the **mere possibility rattles global markets** and serves as a powerful diplomatic lever. For UPSC aspirants, this issue is relevant under **GS Paper II (International Relations)**, **GS Paper III (Energy Security, Economic Development)**, and **Essay** topics on global interdependence and strategic vulnerabilities.

11. India's Space Race: Empowering Startups and Strengthening ISRO

1. ISRO's Strategic Outsourcing to HAL

- The Indian Space Research Organisation (ISRO) has outsourced the **complete manufacturing of a satellite launcher to Hindustan Aeronautics Ltd (HAL)**.



- This marks a **paradigm shift in ISRO's strategy**, freeing its scientific and engineering resources to focus on **frontier space technologies** such as **reusable rockets**, **orbital security**, and **deep-space exploration**.
- Previously, ISRO collaborated with 500+ companies like L&T, Godrej Aerospace, and MTAR Technologies for components and systems.

2. Private Sector Participation and Institutional Framework

- Two dedicated bodies support private participation:
 - **NewSpace India Ltd (NSIL)** – commercial arm for ISRO's space services.
 - **Indian National Space Promotion and Authorization Centre (IN-SPACe)** – regulator and promoter for private space activity.
- Private space startups are now developing **innovative propulsion systems**, **satellite control mechanisms**, and **novel materials**.

3. Emerging Space Technologies and Security Concerns

- ISRO is pushing for **reusable rockets** to reduce launch costs and enhance frequency.
- Focus is shifting towards **Low Earth Orbit (LEO) satellites** for telecom, surveillance, and military use (e.g., satellite-guided drones).
- Strategic threats like **anti-satellite weapons (ASAT)** and **microwave zappers** (possibly powered by space-based nuclear reactors, as explored by Russia) underscore the need for **orbital security** capabilities.

4. Challenges Faced by Startups

- Indian space startups, while innovative, **lack access to critical testing infrastructure**—such as those of ISRO and DRDO.
- Unlike **SpaceX** in the US, Indian firms are **hampered by limited risk capital, bureaucratic red tape, and restricted infrastructure access**.
- Startups require **policy support, risk funding, and testing access** to grow into global competitors.



5. Constitutional & Legal Aspects

- **Space activities in India are governed by ISRO under the Department of Space**, which operates under **Article 73** (Union Government's executive powers).
- The proposed **Space Activities Bill**, when enacted, is expected to **regulate commercial space activities**, promote ease of doing business, ensure safety, and delineate liability frameworks.

Key Terms for UPSC

- **Reusable Rockets:** Launch vehicles that can be recovered and reused for multiple missions, drastically reducing costs.



- **Low Earth Orbit (LEO):** Orbit at 160–2000 km altitude; useful for surveillance, telecom, and quick revisit times.
- **IN-SPACe:** A single-window nodal agency for enabling and regulating private players in the space sector.
- **NSIL:** Government-owned commercial entity managing ISRO's services and technologies.

Conclusion

India's space ecosystem is undergoing a **transformative shift**—from state-dominated innovation to a **competitive, startup-driven space economy**. By delegating production tasks to public and private firms, ISRO can now spearhead **next-gen space tech**, while **startups explore breakthroughs in design and execution**.

12. Beej Utsav: Promoting Indigenous Seeds for Agricultural Sustainability

1. Indigenous Seeds and Agricultural Sustainability

- The **Beej Utsav (Seed Festival)** was organized across the tribal belt of **Rajasthan, Madhya Pradesh, and Gujarat**, emphasizing the **critical role of traditional, indigenous seeds** in ensuring **sustainable agriculture**.
- Over **9,400 tribal participants**, including women and children, learned about **seed preservation, seed sovereignty, biodiversity, and climate resilience**.

2. Community-Led Initiatives and Recognition

- Local community organizations such as **Krishi Evam Adivasi Swaraj Sangathan, Gram Swaraj Samooh, Saksham Samooh, and Bal Swaraj Samooh** organized the festival with support from **Vaagdhara**, a Banswara-based NGO.
- **Titles like 'Beej Mitra' (Seed Friend) and 'Beej Mata' (Seed Mother)** were awarded to farmers practicing exemplary seed preservation methods.



3. Activities Promoting Seed Knowledge

- Events held in **60+ panchayats** featured:
 - **Beej Samvad (seed dialogues)**
 - **Biodiversity fairs**
 - **Seed ball making and plantation drives**
- These activities reinforced community awareness about **seed biodiversity and the threats of commercial hybrid seeds**.



4. Significance of Seed Sovereignty

- **Seed Sovereignty** refers to the **right of farmers to save, use, exchange, and breed their own seeds**, free from dependence on corporate-controlled hybrid seeds.
- Festival organizers highlighted that nearly **70% of small and marginal farmers rely on market-based hybrid seeds**, often tied to **chemical inputs and higher health and economic risks**.

5. Climate Resilience and Food Security

- **Indigenous seeds**, being **climate-resilient and low-input**, are crucial for **mitigating the impacts of climate change**, enhancing **food security**, and promoting **agro-biodiversity**—especially in tribal and rain-fed regions.
- The festival framed seeds not just as inputs, but as **symbols of life, nutrition, culture, and resistance to ecological degradation**.

Key Definitions for UPSC

- **Indigenous Seeds**: Locally adapted seeds evolved over generations, maintained by farmers using traditional knowledge.
- **Seed Sovereignty**: The right of farmers to retain and control seed use and propagation without external corporate or state interference.
- **Agro-biodiversity**: Variety and variability of animals, plants, and microorganisms used directly or indirectly for food and agriculture.

Conclusion

The **Beej Utsav** is a **grassroots assertion of seed sovereignty**, tribal identity, and ecological sustainability. It reflects a growing movement to resist **corporate seed dependence** and reconnect with **traditional ecological knowledge systems**.

13. Rising Evaporative Demand and India's Research Gaps: A Climate Risk Insight

1. What is Evaporative Demand?

- **Evaporative Demand** is the **atmosphere's "thirst" for water** — it quantifies how much water would evaporate from a surface if water availability were unlimited.
- It is a **function of temperature, humidity, wind speed, and solar radiation**, rather than actual water availability.
- A related term, **standardised short-crop evapotranspiration**, is used to guide irrigation decisions and is calculated assuming optimal vegetation conditions.





2. Concept of “Thirstwaves” and Global Research

- The term “**Thirstwave**” was introduced by researchers Kukal and Hobbins (2025) to describe **three or more consecutive days of extreme atmospheric evaporative demand**.
- Their U.S.-based study finds that **thirstwaves are becoming more frequent, intense, and longer**, especially during growing seasons.
- These shifts exacerbate **agricultural stress** even when irrigation is sufficient, affecting crops like **rice and wheat**.

3. India’s Evaporative Demand Trends

- Earlier IMD research (1997) by Chattopadhyay and Hulme found **decreasing evapotranspiration** over 30 years due to **counteracting humidity**.
- However, more recent climate models predict that **rising temperatures will eventually dominate**, leading to increased **evaporative demand**, particularly across **Northern India, Western & Eastern Himalayas**.

4. Data and Research Gaps in India

- India lacks **comprehensive data and models** on extreme evaporative events such as **thirstwaves**.
- There is an urgent need to evaluate the **crop-specific, ecosystem-specific, and regional vulnerabilities** to these extremes.
- Ongoing Indo-global research collaborations (e.g., between NIT-Jalandhar and University of Idaho) are attempting to **map thirstwave patterns in South Asia**.

5. Implications for Agriculture and Climate Policy

- Increased evaporative demand **dries out plants, soils, and forests**, undermining agricultural productivity and water security.
- **Climate-vulnerable regions** may not necessarily be the hottest or driest—**worst thirstwaves may occur in unexpected areas**, requiring governments to **reassess climate prioritization policies**.
- It has implications for **crop planning, irrigation scheduling, drought preparedness, and food security strategies**.

Key Definitions

- **Evapotranspiration**: The sum of evaporation from land surfaces and transpiration from plant leaves.
- **Standardised Short-Crop Evapotranspiration (ET_{sc})**: A reference measure used to estimate crop water needs under ideal conditions.
- **Thirstwave**: A newly defined period of extreme, persistent atmospheric demand for water, even without an actual drought.

Conclusion

The growing **evaporative demand due to global warming** is an underappreciated climate stressor with serious implications for India’s **agriculture, water management, and food security**.



To build **climate resilience**, India must bridge its **research and data gaps**, develop **real-time monitoring tools**, and integrate evaporative demand into **irrigation planning and climate risk assessment frameworks**. Understanding and addressing **thirstwaves** is critical for **adaptive governance and sustainable development**, especially in the face of erratic monsoons and prolonged dry spells.

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