Today's Prelims Topics

Technology Perspective and Capability Roadmap (TPCR-2025)

Context

India has unveiled its Technology Perspective and Capability Roadmap (TPCR-2025_.

About Technology Perspective and Capability Roadmap (TPCR-2025)

- It is a 15-year capability planning document prepared by the **Ministry of Defence.**
- **Purpose**:
  - Guides Indian defence industry on future requirements.
  - Reduces reliance on imports, boosts indigenous R&D.
  - Anticipates emerging threats in **nuclear, cyber, space, and drone domains**.
- **Key Features**:
  - **Nuclear Deterrence**: survivability systems, delivery platforms, CBRN (Chemical, Biological, Radiological, Nuclear) protection, nuclear command-and-control infrastructure.
  - **Drone Warfare**: stealth drones (range up to 1,500 km, altitude 60,000 ft), loitering munitions, AI-enabled targeting, drones for NBC detection and artillery guidance.
  - **Electronic Warfare**: adaptive jamming systems, electronic denial bubbles (15 km radius) to counter hostile drone swarms.
    CBRN Defence: radiation detection tools, mobile decontamination units, unmanned ground vehicles for reconnaissance.

Source: The Hindu

World Meteorological Organization (WMO)

Context

The World Meteorological Organization (WMO) released the Air Quality and Climate Bulletin.

Key Highlights

- **PM2.5 Pollution**: One of the **leading global health threats**, causing millions of premature deaths annually.
    - Levels have **declined** in **North America, Europe, and East Asia** due to stringent regulations.
    - Remain **alarmingly high** in **South Asia** and **high-latitude regions**, aggravated by **wildfires** and **industrial emissions**.
- **Shipping Emissions (MARPOL VI Regulations)**: Restrictions on **sulfur content in marine fuels** improved air quality and reduced health risks.
    - However, cutting sulfate aerosols slightly reduced their **cooling effect**, thereby **intensifying global warming**.
- **Air Quality–Climate Interactions**: Certain pollutants like **ground-level ozone** act as **warming agents**.
    - Climate change, in turn, affects air pollution via **altered chemical reactions**, **natural emissions**, and **changes in human activity**.
- **Aerosols**: **Black carbon** and other dark aerosols absorb sunlight, contributing to **warming**.
    - **Sulfates and other reflective aerosols** deflect solar radiation, creating a **temporary cooling effect**.

Winter Fog in North India (Indo-Gangetic Plain)

- **Causes**:
    - **PM2.5 particles** from vehicles, industries, and stubble burning act as **fog condensation nuclei (FCN)**.
    - **Temperature inversions** trap these pollutants, prolonging fog episodes.
    - **Urbanization, brick kilns, and ammonium emissions** further intensify the fog problem.
- **Consequences**:
    - **Transport disruptions** (road, rail, air).
    - **Health impacts** such as asthma, respiratory illnesses, and long-term exposure risks.
    - **Fog water** often contains **toxic compounds**, raising environmental and health concerns.

World Meteorological Organisation (WMO)

- It is a specialised agency of the United Nations responsible for coordinating global efforts in meteorology, climatology, hydrology, and related fields.
- **Established** in 1950. (HQ - Geneva, Switzerland)
- **Members:** 193, **(India is a founding member of WMO)**
- **The World Meteorological Congress** is the supreme body of the WMO.
- It plays a crucial role in providing reliable weather forecasts, climate data, and early warning systems for natural disasters.

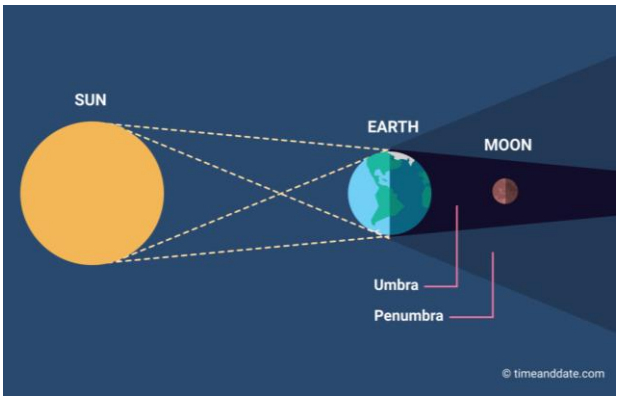
Source: Economic Times

Blood Moon

Context

September 8, 2025, people across **Asia, Australia, and parts of Africa** witnessed a total lunar eclipse, popularly called a **Blood Moon**.

What is a Lunar Eclipse?



- A **lunar eclipse** occurs when the **Earth comes between the Sun and the Moon**, blocking sunlight from directly reaching the Moon.
- **Types:**
    - **Total Eclipse**: The Moon passes completely through Earth's **umbra** (dark inner shadow).
    - **Partial Eclipse**: Only part of the Moon enters the umbra.
    - **Penumbral Eclipse**: The Moon passes through Earth's **penumbra** (outer shadow), causing faint dimming.
- Unlike solar eclipses, lunar eclipses are **safe to watch with the naked eye**.

What is a Blood Moon?

- A **Blood Moon** appears during a **total lunar eclipse**.
- When sunlight passes through **Earth's atmosphere**, shorter wavelengths like **blue light** scatter away (Rayleigh scattering), while **red light** passes through and falls on the Moon, making it appear **red or coppery**.
- **Significance**:
    - The exact shade of red depends on **dust and pollutants** in Earth's atmosphere.
    - For example, **volcanic eruptions** in the past made Blood Moons appear darker, providing clues about **climate and environmental history**.

Source: Indian Express

100 years of Self Respect Movement

Context

This year marks the 100 years of establishment of the self respect movement.

About Self Respect Movement

- **Founded**: 1925 in Tamil Nadu
- **Founder**: E.V. Ramasamy "Periyar"
- **Objectives:**
  - **Abolish caste hierarchy** and untouchability.
  - Promote **rational thinking** and discourage blind faith, superstition, and dominance of religious orthodoxy.
  - Advocate for **self-respect and dignity** among oppressed castes and women.
  - Push for **social equality**, **inter-caste marriages**, and **widow remarriage**.
  - Challenge the monopoly of **Sanskrit and Brahmin priests** in rituals; promote Tamil language and culture.
- **Impact:**
  - Helped in **social awakening** among backward and marginalized communities in South India.
  - Gave rise to a new sense of **Tamil identity and Dravidian nationalism**.
  - Led to reforms in marriage laws (recognition of self-respect marriages in 1967 in Tamil Nadu).
  - Inspired political parties like **Dravida Munnetra Kazhagam (DMK)**.

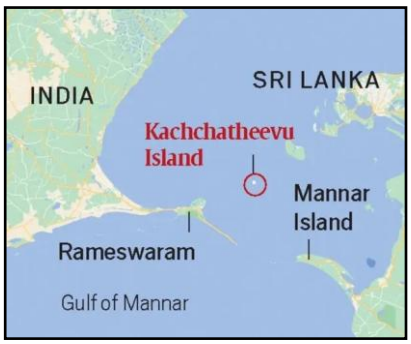
Source: The Hindu

Katchatheevu Island

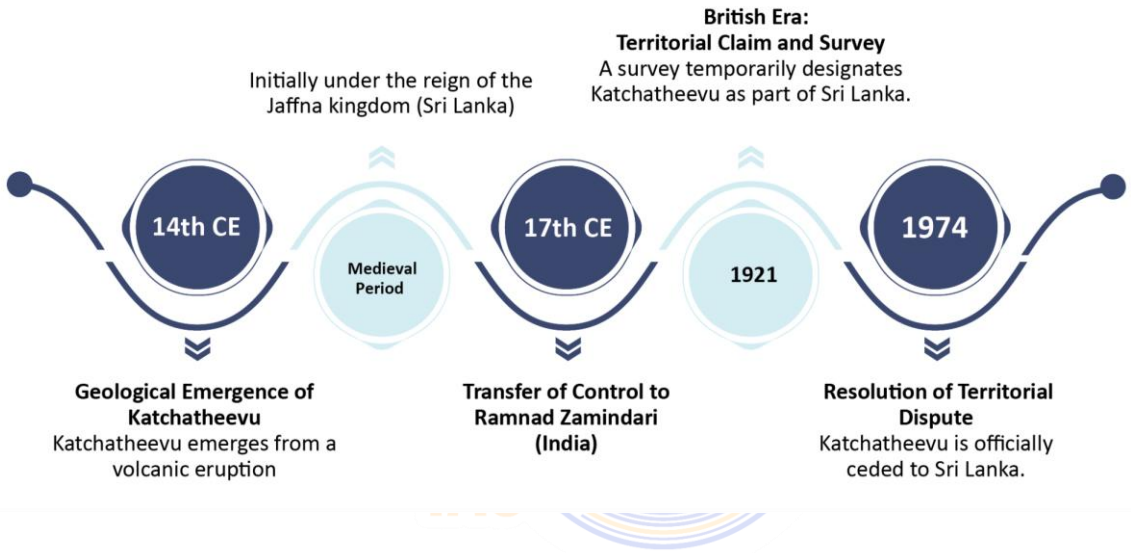
Context

The Sri Lankan president recently visited Katchatheevu island.

About the Island



- Katchatheevu is an **uninhabited off-shore island** in the **Palk Strait.**
- It has been **used by fishermen** from both countries for centuries as a resting point during **fishing expeditions in the Palk Strait.**
- The island lacks fresh water sources, making it unsuitable for permanent habitation.



The Indo-Sri Lankan Maritime Agreement of 1974

- Aimed to definitively resolve the maritime boundary between India and Sri Lanka.
- The Indian Government ceded Katchatheevu to Sri Lanka, deeming it of minimal strategic value, to strengthen ties with Sri Lanka.
- The **agreement allowed Indian fishermen** access to Katchatheevu for **rest, drying nets, and shrine visits** without a visa, though it left some **issues regarding fishing rights** unresolved.
- **Subsequent developments:**
    - **1976**: The fishing vessels and fishermen of India shall **not engage in fishing in the historic waters, the territorial sea and the Exclusive Economic Zone of Sri Lanka,** creating ambiguity over fishing rights near Katchatheevu.
    - **Impact of Sri Lankan Civil War (1983-2009)**: The conflict put border disputes on hold, with Indian fishermen often encroaching into Sri Lankan waters, leading to tensions over fishing practices and resources.

Source: The Hindu

New Radar Systems Along Northern And Western Borders

Context

The Indian Army is procuring advanced radars to plug surveillance gaps along the northern and western borders.

About the New Radar Systems

- **Purpose:** Detect and engage **low radar cross-section (RCS) objects**, such as small drones, which are hard to track using conventional systems.
- **Types:**
  - Low Level Light Weight Radars (Enhanced) – LLLR-E.
  - Upgraded ASR (Air Surveillance Radars).
  - Air Defence Fire Control Radars (ADFCR-DD) specifically for drone detection.
- **Features**
  - Capable of detecting **small, fast-moving, and low-flying drones**.
  - Can track **swarms of drones** used for surveillance or attacks.
  - Provides **sharper visibility** and **quicker threat responses** for commanders in the field.
- **Procurement:** The Army has issued a **Request for Information (RFI)** to vendors for radar systems with ranges of **30–45 km**.
  - These systems will become a key component of India's **counter-drone architecture**.

Source: Indian Express

News In Short

Hezbollah	**News?** The UN Security Council has approved the phased withdrawal of UN peacekeepers from Lebanon by 2027, reigniting debate over the challenge of disarming Hezbollah despite its current weaknesses. **About Hezbollah** ● Hezbollah translates to "Party of God." ● **Formation**: Emerged in **1982 in Lebanon** as an armed resistance force after **Israel's invasion**. ● **Nature**: ○ A **Shia Islamist militant and political organization**, deeply rooted in Lebanon's Shia community. ○ Functions as both a **militia** and a **political party**. ● **Support**: Backed by **Iran's Revolutionary Guard Corps**, receiving funding, weapons, and training. ● **Influence in Lebanon**: ○ Holds significant sway in **politics, security, and society**. ○ Maintains a large **stockpile of missiles and rockets**. ○ Presents itself as a **resistance movement against Israel**, gaining domestic legitimacy. ● **Past Conflicts**: ○ Fought wars with **Israel in 2000 and 2006**. ○ Played a role in **Syria's civil war** supporting the Assad regime. **Source:** Indian Express
Dr. Bhupen Hazarika 	**News?** The Inland Waterways Authority of India (IWAI), under the Ministry of Ports, Shipping and Waterways (MoPSW), launched **"Bistirna Parore: A Musical Voyage from Sadiya to Dhubri"** to mark the birth centenary of Dr. Bhupen Hazarika. **About Dr. Bhupen Hazarika** ● **Birth**: 8 September 1926, Sadiya, Assam ● **Death**: 5 November 2011, Mumbai ● **Profession**: ○ Renowned **playback singer, lyricist, musician, poet, filmmaker, and writer**. ○ Popularly known as the **"Bard of Brahmaputra."** ● **Political and Social Engagement**: ○ Served as **Chairman of the Sangeet Natak Akademi** (1999–2004). ○ Was also elected as an **MLA in Assam (1967)**. ○ Nominated member of the **Assamese intelligentsia and cultural revival movements**. ● **Honours and Awards**: ○ Dadasaheb Phalke Award (1992) ○ Padma Bhushan (2001). ○ Bharat Ratna (2019, posthumously) **Source:** PIB
Pismis- 24	**News?** NASA's James Webb Space Telescope (JWST) has captured a

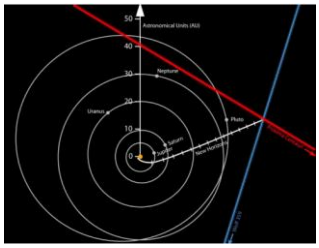
stunning infrared image of Pismis 24.

About it

- A young star cluster located in the **Lobster Nebula**, about **5,500 light-years away in Scorpius**.
- The region is an **active site of star formation**, where radiation and stellar winds from newborn stars sculpt surrounding **gas and dust spires**, triggering further star birth.
- It will serve as a natural laboratory to study massive star birth and evolution.

Source: NASA

Stellar Parallax



News? Astronomers have shown that spacecraft can navigate deep space using just two stars as reference points through a method called stellar parallax.

About Stellar Parallax

- As Earth orbits the Sun, we look at a star **from two opposite sides** of Earth's orbit (say, in January and July).
- The star seems to **move slightly against the background of more distant stars**.
- This apparent shift is called **stellar parallax**.
- By measuring the **parallax angle** (the apparent displacement of the star), astronomers can calculate the **distance** to the star using trigonometry.
    - Small parallax → star is **far away**.
    - Larger parallax → star is **closer**.
- **Uses**:
    - **Space navigation**, allowing spacecraft to autonomously determine their location without constant signals from Earth.

Apatani Tribe

News? The Apatani women's tattoos and nose plugs—once symbols of identity and protection—are now fading.

About the Apatani Tribe

- **Location**: Indigenous tribe living in the **Ziro Valley**, Lower Subansiri district, Arunachal Pradesh.
- **Distinctive Identity**:
    - Women traditionally wore **facial tattoos** and **large wooden nose plugs**.
    - Tattoos (called tappe) were usually done when a girl was about 10 years old.
- The Apatanis are known for **sustainable wet rice cultivation and fish farming.**

Source: The Hindu

Places in News

Addis Ababa

News? The Second Africa Climate Summit (ACS2) is being held in Addis Ababa.

About Addis Ababa

- **Capital city** of **Ethiopia**.
- Located in the **Ethiopian Highlands**, at an altitude of ~2,355 metres, making it one of the **highest capitals in the world**.
- Name means **"New Flower"** in Amharic.
- Headquarters of the **African Union (AU)** and the **United Nations Economic Commission for Africa (UNECA)**.

Mains Topics

Gender Divide in Educational Expenditure in India

Context

In recent times, India has improved **female enrolment** in schools (girls = 48% of school population; higher education GER slightly higher for women than men). However, a **hidden gender gap** persists in **family spending** on children's education.

Key Findings of NSS Report

- **Gender Gap in Expenditure:** Across all stages of schooling, families spend less on girls than boys.
    - **Rural India:** Families spent ₹1,373 or 18% more on boys than girls in terms of fees, books, uniforms, transport.
    - **Urban India:** Per-student expenditure on girls was ₹2,791 less than on boys.
    - At **higher secondary**, spending is **30% higher on boys**.
    - **School Type Preferences: Government schools - 58.4% of girls** enrolled as compared to **54% of boys**.
    - **Private unaided schools (more expensive): 34% of boys** enrolled, while only **29.5% of girls** are enrolled.

State-wise Variations

- **Government vs. Private School Enrolment**
    - **Delhi:** 54% boys vs. 65% girls in govt. schools; 38.8% boys vs. 26.6% girls in private schools.
    - Madhya Pradesh, Rajasthan, Punjab: >10 percentage point gaps.
- **Balanced ratios:** Tamil Nadu, Kerala: Boys and girls nearly equal in govt. and private schools.
- **Reverse trend:** Northeastern States: More girls in private schools.
- **Andhra Pradesh, Himachal Pradesh, Kerala:** Higher spending on girls in higher secondary, especially urban areas (due to transport costs linked to safety).

Reasons Behind Gender Gaps in Education Expenditure

- **Societal Mindset & Patriarchy:** Families perceive boys as "future breadwinners," worth higher investment. Girls are seen as having lower economic returns due to marriage and caregiving roles.
- **School Choice Bias:** Boys more often sent to private schools; girls kept in government schools. Reflects a cost-saving preference.
- **Tuition Investment Bias:** Families prioritise additional tutoring for boys, especially in higher classes, where exam competition is higher.
- **Dropouts & Early Marriage:** Higher female dropout at secondary/higher secondary → less spending on girls beyond Class 10.
- **Safety & Mobility Concerns:** Families sometimes limit girls' enrolment in distant/private schools due to safety worries, reducing expenditure.
- **Subsidies & Schemes for Girls:** Scholarships, free uniforms, and fee waivers reduce **direct expenditure on girls**, skewing the spending figures.

Source: The Hindu

Building Climate Resilient Cities for Future

Context

Indian cities are set to play a **decisive role** in the country's future. By **2050–2070**, urban population may near **1 billion**, with megacities larger than many countries. This rapid urbanization creates both **opportunities and risks**.

Urban Infrastructure Needs & Investment by 2070

- **Urban Growth Projections:**
  - **Population:** Urban population to reach **1.1 billion by 2070** (from 480 million in 2020).
  - **Housing:** Need for **144 million new dwelling units** (double existing stock).
  - **Solid Waste:** Cities to generate **415 million tons by 2050** (285 million tons by 2035).
- **Sectors Requiring Investment:** Urban transport, Water supply, sanitation, sewerage, stormwater drainage, Solid Waste Management (SWM).
- **Climate-resilient design:** 9%–27% extra investment for green tech, flood protection, clean energy.
- **Current Spending vs. Future Needs:**
  - **Current capital spending: $10.6 billion/year** (2011–2018) - **~0.7% of GDP.**
  - **Future need:** More than double current GDP share for infrastructure to meet 2070 goals.

Key Challenges Faced by Indian Cities

Climate Impacts and Hazards

- **Flooding:** Flooding is increasing due to poor drainage and rapid construction. By **2030**, over two-thirds of urban dwellers will be at risk of **surface/pluvial flooding**.
  - Estimated losses: **$5 billion (2030)** → **$30 billion (2070)**.
- **Extreme Heat:** Urban heat island effect raises city temperatures 3–4°C above rural areas. With rising temperatures, risk of **heat-related deaths and productivity losses** grows.
  - Heat-related deaths may double by 2050.
- **Housing Vulnerability**: Informal settlements often lie in low-lying, flood-prone areas with poor-quality housing. Current housing stock is highly vulnerable to **floods, heat, cyclones, landslides, earthquakes**.
- **Water Scarcity**: Rising demand and climate stress create shortages, especially in slums with poor water access.
  - **Eg:** Chennai's "Day Zero" crisis (2019) when reservoirs ran dry.

Urban Development and Planning Gaps

- **Rapid, Unplanned Urbanization:** Population will almost double by 2050, pushing growth into **city fringes and high-risk zones**.
- **Inadequate Planning**: Over 50% of towns lack approved master plans; existing plans are often poorly implemented.
- **Loss of Green Cover**: Low per capita green space worsens heat and reduces natural flood absorption.
- **Transport Vulnerability**: Even **10–20% road inundation** can paralyse **50% of transport systems**. Heat can warp rails and disrupt transport.

Rising Greenhouse Gas (GHG) Emissions

- **Energy, Transport, Buildings:** Horizontal, less-dense sprawl increases dependence on cars and energy demand.

- **Solid Waste Management (SWM)**: Inefficient waste disposal produces methane (20% of global human-induced methane emissions). Blocked drains from waste worsen flooding.
- **Housing Sector:** Construction materials (cement, steel) and energy use in buildings add heavily to the carbon footprint.

Financing and Institutional Weaknesses

- **Huge Investment Needs:** Climate-resilient urban infrastructure requires **$2.4 trillion by 2050** and **$10.9 trillion by 2070**.
- **Low Revenue & Dependence:** Municipalities rely heavily on central/state transfers; property tax collection is far below global norms.
- **Limited Spending Capacity**: Cities struggle to even use existing budgets due to weak capacity.
- **Lack of Climate Finance Tracking**: Climate-related spending isn't tracked, making accountability and financing difficult.
- **Low Private Sector Role**: Private sector contributes only **5%** of urban infrastructure financing, deterred by policy and regulatory risks.
- **Fragmented Governance:** Overlapping roles across agencies cause delays and poor coordination.
- **Limited Technical Expertise:** Small/medium towns lack trained staff for risk assessment and climate planning.

Urban Climate Resilience Initiatives

- **Ahmedabad - Heat Action Plan (2013):** Saved ~1,200 lives annually; includes early warning, awareness, medical capacity, and heat-reduction measures.
- **Kolkata - Flood Forecasting & Early Warning System:** 400 sensor nodes monitoring air, water stagnation, and temperature; alerts via mobile, radio, TV.
- **Indore - Solid Waste Management (SWM):** Door-to-door collection, waste-to-energy plants, ICCC for tracking.

Global Examples

- **Yokohama, Japan:** Integrated flood protection, carbon-neutral roadmap by 2050 using AI/IoT.
- **Beira, Mozambique:** Combined drainage with nature-based solutions (river restoration, park creation).
- **Shizuoka, Japan:** Multi-layered flood storage areas (690,000 m^3).

Way Forward: Building Climate-Resilient and Low-Carbon Cities

City-Level Action Plans

- **Risk Assessments:** Regular climate risk studies, GHG inventories, and integration into **land-use planning**. Prevent construction in high-risk zones.
- **Early Warning Systems:** Multi-hazard warning systems with last-mile connectivity for vulnerable groups.
    - **Eg**: Odisha's cyclone warning system, credited with saving thousands of lives.
- **Climate-Sensitive Development:** Stronger building codes, resilient infrastructure, risk-sensitive zoning.
- **Integrated Risk Reduction**: Use both **grey infrastructure** (drainage, embankments) and **green infrastructure** (wetlands, parks, trees). Promote **cool roofs, urban greening, and water-sensitive design**.
- **Focus on Vulnerable Populations**: In-situ upgrades in slums, adaptive social protection, relocation as last resort.
- **Compact & Green City Planning**: Encourage **Transit-Oriented Development (TOD)**, mixed-use planning, and managed densification to reduce emissions.
- **Municipal Services Upgrade**: Waste-to-energy plants, recycling, and methane capture at landfills.

- **Resilient Transport**: Expand public transport, encourage walking/cycling, electrify buses, build redundancy in road systems.
- **Green Buildings**: Solar rooftops, energy-efficient designs, incentives for low-income housing retrofits.

National and State-Level Resilience Programs

- **Urban Resilience Missions:** Launch national programs on **flood resilience and heat management**.
- **Capacity Building**: Train municipal staff, hire skilled urban planners and engineers.
- **Data Systems**: National hub for **climate resilience data**, GHG inventories, and project preparation.
- **Integrated Policies**: Align housing, waste, and transport policies with climate goals.

Financing and Institutional Reforms

- **Increase Urban Investment:** Raise share of GDP for urban infrastructure, especially climate-related spending.
- **Boost Municipal Revenues**: Reform property tax, user fees, and service charges to raise own-source revenue.
- **Climate Budget Tagging**: Track climate-related spending in city accounts to improve transparency and attract funding.
- **Innovative Financing**: Use **green bonds, carbon markets, land value capture, tax-increment financing**, and international climate funds.**Engage Private Sector**: Create bankable projects, improve procurement, offer credit guarantees, and expand insurance markets.

Stakeholder Collaboration

- **Multi-sector Planning:** Integrate transport, housing, water, and waste management planning.
- **Regional Cooperation**: Address floods, waste, and pollution at **river-basin and metropolitan levels**, not just city boundaries.
- **Citizen Participation:** Engage communities in planning, waste segregation, water saving, disaster response. Awareness campaigns for climate action.

Source: Indian Express, World Bank Report on Indian Cities

GST Reforms - Impact on Economy

Context

India's GST has seen its biggest revamp since 2017, aimed at easing consumer costs, boosting demand, and giving a festive-season growth push - though it also raises concerns about revenue loss and fiscal sustainability.

Why was an Overhaul Needed?

- **Complex Structure:** Earlier, GST had multiple slabs - 0%, 5%, 12%, 18%, 28% - plus a compensation cess. This created confusion, compliance burden, and frequent disputes.
- **End of Compensation Cess**: The legal provision for levying the cess (used to compensate states for revenue loss) is ending in 2025. Without rationalisation, some "sin goods" like tobacco would have suddenly become cheaper - politically and socially unacceptable.
- **Boosting Consumption**: With U.S. imposing **50% tariffs on Indian exports**, India needed to boost **domestic demand** to offset external shocks.
- **Stimulating Consumption:** With Q1 GDP growth at **7.8%**, the government wants to sustain momentum and avoid slowdown in later quarters.
    - Lower taxes mean cheaper goods, which can stimulate consumer spending.
- **Next-Generation Reform Push**: Simplifying GST was a long-standing demand of industries and states.

Major Changes in GST Structure

- **New Slabs:**
    - **5%:** Essentials & consumer staples (food items, soaps, shampoos, EVs, small cars, farm equipment).
    - **18%:** Aspirational goods (TVs, ACs, cement, consumer durables, non-luxury cars, two-wheelers).
    - **40%:** Sin goods (tobacco, luxury cars, ultra-luxury items).
- **Insurance:** Premiums for personal **life and health insurance exempted** from GST.
    - But insurers have lost input tax credit, which may increase their costs.
- **Rate Rationalisation:** 91% of items (413 out of 453) saw rate cuts.

Sectors That Benefit

- **Healthcare:** GST cut from **12% to 5%** on many medical products → cheaper treatment.
- **Renewable Energy:** Taxes on solar/wind components reduced (12% → 5%) → boost to clean energy.
- **Real Estate & Construction:** Cement cut (28% → 18%), granite and tiles cheaper → lowers housing cost.

Sectors with Concerns

- **Aviation:** Higher GST on non-economy seats criticized by airlines.
- **Vegetable Oil Sector:** Inverted duty issue unresolved.
- **MSMEs:** Labour charges now taxed at **18%** (up from 12%), raising cost of operations.

Economic Impact of the GST Overhaul

Short-Term Impact

- **Boost to Consumption:** Lower GST on everyday goods →means **lower retail prices**. With **more disposable income**, households can spend on other goods and services, creating a **multiplier effect** on demand.
- **Inflation Moderation:** Lower GST on essentials like food, medical items, and construction materials could **soften inflationary pressures**.
- **Disruption in Some Sectors:**

- Airlines fear higher GST on non-economy seats will **raise fares** and hurt demand.
- Auto dealers worry consumers will **delay purchases until new rates apply** (Sept 22 onwards).

Medium-Term Impact

- **Virtuous Investment Cycle:** More consumer demand → industries expand production → more jobs created → higher household incomes → more demand again.
  - **Eg:** Cheaper cement reduces construction costs → housing demand rises → jobs in real estate and allied industries → more income and spending.
- **Support to Growth Amid External Pressures:** With the U.S. imposing a 50% tariff on Indian imports, exports may suffer. Domestic consumption, supported by lower GST, can **cushion India's GDP growth** from global shocks.
- **Push for Green Economy:** Lower GST on renewable energy components accelerates the **clean energy transition**, aligning economic growth with sustainability goals.

Long-Term Impact

- **Formalisation of Economy:** Simplified GST slabs reduce compliance burden for MSMEs, bringing more small firms into the **formal tax net**.
- **Attracting Investment:** A simpler and more predictable GST system improves India's **Ease of Doing Business** rankings.
- **Fiscal Challenges for Union & State Government:** States' concerns about compensation could strain **Centre-State relations**, unless a new framework for revenue-sharing is developed.
  - **Centre's Estimate:** Revenue shortfall of **₹48,000 crore**.
  - **States' Worry:** They may bear 70% of shortfall; demand for a cess on 40% slab not accepted.
- **Structural Reform Direction:** Over time, India may move to just **2–3 GST slabs**, like other mature economies. This could simplify tax administration, cut compliance costs, and create a more **efficient, growth-oriented tax system**.

What More Needs to Be Done?

- **Ensure Revenue Neutrality:** Protect States' fiscal health. Explore formula-based transfers or temporary revenue-sharing adjustments.
- **Address Inverted Duty Structures:** Still unresolved in **vegetable oils, textiles (partly), and MSMEs**.
- **Strengthen Compliance & Broaden Base:** Use of digital tools (AI-driven audits, e-invoicing, GSTN data analytics) to curb evasion.
- **Expand Formalisation:** Encourage MSMEs and informal sectors to join GST net with simplified procedures.
- **Integrate with Climate Goals:** Use GST incentives (lower slabs) for **green goods and EVs**, higher slabs for polluting industries.

India's **GST 2.0** reform marks a **bold leap** toward a fairer, simpler tax system. It promises to drive consumption, support economic resilience, and move India toward global tax norms. But the government will need to manage **revenue losses and state-level fiscal pressures** carefully to ensure sustainability.