

DAILY CURRENT AFFAIRS (DCA)

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MAHAKUMBH STAMPEDE

Context

- The recent tragic stampede at the Mahakumbh Mela 2025 in Prayagraj which led to the loss of lives, highlighting the critical lapses in crowd management and safety measures.

What is a Stampede?

- A **stampede** refers to a sudden, uncontrolled movement of a large crowd, often triggered by panic, fear, or limited exit routes.
- Stampedes typically occur in **religious gatherings, sports events, concerts, and public rallies** when crowd density exceeds five persons per square metre and proper crowd control measures are lacking.

Past Incidents of Stampedes

- 2015 Rajahmundry Godavari Pushkaralu Stampede:** A religious gathering led to a rush at a bathing ghat, killing 27 people.
- 2008 Chamunda Devi Temple Stampede (Jodhpur):** Around 224 people lost their lives when panic spread among thousands of devotees.
- 2005 Mandhardevi Temple Stampede (Maharashtra):** Over 300 pilgrims died in a tragic incident caused by overcrowding.
- 2004 Kumbh Mela Stampede (Nashik):** More than 40 devotees were crushed to death due to a sudden surge in a narrow street.

Factors that causes Stampedes

- Overcrowding** – Due to lack of space and poor regulation of the number of attendees.
- Panic and Fear** – Sudden commotion or rumors can cause people to move uncontrollably.
- Narrow Passageways and Bottlenecks** – Limited exit routes or narrow walkways can create dangerous congestion.
- Poor Crowd Control Measures** – Lack of proper policing, barricades, and designated lanes.
- Lack of Emergency Response Planning** – Delayed medical aid and ineffective coordination between authorities.
- Sudden Events or External Triggers** – Fire, loud noises, or security threats leading to chaos.

Impacts of a Stampede

- Loss of Human Lives** – Many people get trampled, leading to deaths due to asphyxiation and injuries.
- Serious Injuries** – Fractures, internal bleeding, suffocation, and crush injuries.

- Psychological Trauma** – Survivors and their families suffer long-term psychological distress.
- Economic Losses** – Compensation to victims, loss of business, and financial burdens on healthcare facilities.
- Damage to Public Image** – Questions on government and administrative efficiency arise.

Challenges in Handling Stampedes

- Unpredictability** – A stampede can start in seconds with little to no warning.
- High Crowd Density** – Millions of people present at a single venue make control difficult.
- Lack of Awareness** – Many attendees are unaware of safe movement and emergency exits.
- Delayed Medical Response** – Providing first aid and reaching injured individuals quickly is difficult.
- Coordination Between Agencies** – Multiple authorities (police, fire services, medical teams) need seamless collaboration.
- Limited Resources and Infrastructure** – Insufficient barricades, CCTVs, emergency exits, and trained personnel.

NDMA Guidelines for Managing Stampedes

- Prevention Measures:**
 - Crowd Regulation:** Strict monitoring and control of the number of attendees.
 - Designated Entry & Exit Points:** Clearly marked and widely spaced routes to avoid congestion.
 - Public Awareness:** Educating people on safe movement and behavior in crowded spaces.
 - Use of Technology:** Surveillance cameras, drone monitoring, and real-time crowd density analysis.
 - Adequate Signage:** Clear and visible signs directing people towards exits, medical help, and safe zones.
- Emergency Response:**
 - First Aid and Medical Readiness:** Deployment of ambulances and medical teams near key locations.
 - Training of Security Personnel:** Proper crowd management training for police and event organizers.
 - Use of Public Address Systems:** To provide real-time information and prevent panic.
 - Mock Drills:** Regular practice sessions for emergency evacuation.
 - Coordination Mechanism:** A unified command center linking all emergency response teams.

Way Forward

- To ensure the safety of millions attending events like the Mahakumbh, authorities must implement **holistic and proactive measures**:
 - ◆ **Advanced Crowd Management Technologies**: AI-based crowd monitoring and predictive analytics to identify risks in real time.
 - ◆ **Smart Infrastructure Planning**: Wider roads, increased exits, and better-designed pathways to accommodate large gatherings.
 - ◆ **Strict Regulation of Numbers**: Pre-event registration and digital tracking of attendees.
 - ◆ **Increased Deployment of Trained Personnel**: More security forces with specialized training in stampede prevention.
 - ◆ **Public Participation and Education**: Engaging attendees in drills, awareness programs, and proper conduct training.
 - ◆ **Improved Coordination Between Stakeholders**: Stronger communication between event organizers, law enforcement, and disaster response teams.

Source: TH

HP'S PROJECT FOR CONTROLLED CULTIVATION OF CANNABIS

Context

- In a significant move, the **Himachal Pradesh** government has **approved a pilot project** for the controlled cultivation of cannabis, aiming to harness its medicinal and industrial potential.
 - ◆ It positions **Himachal Pradesh as the fourth state in India** to permit such cultivation, following **Uttarakhand, Madhya Pradesh, and Jammu & Kashmir**.

Background and Rationale

- Cannabis is a naturally occurring weed found throughout Himachal Pradesh, yet its cultivation had been **banned under the Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985**.
 - ◆ **Recent amendments to the NDPS Act** have allowed states to regulate cannabis cultivation for medicinal and industrial purposes under specific licensing and regulatory conditions.
- Himachal Pradesh government's initiative aims to identify suitable cannabis varieties and cultivation practices, **focusing on non-narcotic applications** such as *textiles, paper, food, cosmetics, and biofuel*.

Global Scenario

- Several countries** like *Canada, United States of America, Japan, France, Italy, Hungary, China, Australia, Denmark, and other European countries* are leading in **hemp cultivation and manufacture of multi-utility products** worldwide.
- Presently, the Cannabis crop has been considered as a **'Trillion Dollar Crop'**.
- By joining this global trend, Himachal Pradesh hopes to **tap into the trillion-dollar cannabis market**, which includes over 25,000 products.

Cannabis Sativa L. (Industrial Hemp)

- It is commonly grown as a fiber, seed, biomass or other dual-purpose crop. There are more than 100 cannabinoids present in the plant among which **Tetrahydrocannabinol (THC)** and **Cannabidiol (CBD)** are in major proportions.
- THC is psychoactive** while **CBD is a non-psychoactive compound** and only due to presence of **high THC (Assumed > 0.3%)** in cannabis plants it is **considered as a narcotic crop**.
- Applications**:
 - ◆ Industrial: THC < 0.3%;
 - ◆ Medicinal: THC > 0.3%
- Tetrahydrocannabinol (THC)**: For treatment of **chronic diseases** or symptoms, including *Multiple Sclerosis, Crohn's disease, Alzheimer's disease, cancer and chronic pain*.
- Cannabidiol (CBD)**: It has putative therapeutic applications for treating *psychosis, affective and seizure disorders, inflammation, and neurodegenerative disease*.
- Hemp**: It produces some of the **best and most durable fibers** of natural origin.
 - ◆ Hemp **seed, oil and oilcake** are used in *cosmetics, personal care and pharmaceuticals*, and can be *an alternative food protein source or as an animal feed*.

Legality of Cannabis in India

- Single Convention on Narcotic Drugs (1961), Convention on Psychotropic Substances (1971) and the UN Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (1988).
 - ◆ India adopted the **Single Convention on Narcotic Drugs (1961)** in 1985, and places cannabis alongside drugs like heroin.
- Article 47 of the Constitution of India (DPSP)**: It prohibits harmful drugs and drinks.

- **Narcotic Drugs and Psychotropic Substances Act, 1985 (NDPS Act):** Marijuana is illegal in India.
 - ♦ **Special Provision: Section 14 of the NDPS Act** empowers the Government to, by general or special order, **permit cultivation of cannabis exclusively for horticultural and industrial purposes.**
 - ♦ **Exclusions of the Act:** Bhang, which is made with the leaves of the plant, is **not mentioned in the NDPS Act.**
- It comes under the **jurisdiction of State Governments.**

Controlled Cultivation of Cannabis

- Controlled cannabis cultivation **focuses on non-narcotic applications**, particularly in the pharmaceutical and industrial sectors.
- Varieties with minimal intoxicating properties, **commonly known as hemp**, will be cultivated with **THC content kept below 0.3% to prevent misuse.**
- Hemp's stalks, leaves, and seeds can be converted into textiles, paper, food, cosmetics, and biofuel.

Economic Impact

- The **pilot project** is expected to generate significant revenue, with estimates suggesting an **additional income** of Rs 500 crore annually for the state.
- This move aligns with global trends, as countries like the **US, Canada, and Germany** have already embraced controlled cannabis cultivation for its industrial and medicinal benefits.

Challenges

- Despite the potential benefits, concerns have been raised about regulatory compliance, quality control, and preventing diversion to the illicit market.

Source: DTE

MIDDLE-INCOME TRAP

Context

- India is a **middle income country** despite being the world's fifth-largest economy by nominal GDP, highlighting the issue of **Middle-income Trap.**

About

- As per the Finance Ministry India is expected to become **the third-largest economy in the world** with a GDP of **\$5 trillion** in the next three years and touch **\$7 trillion by 2030.**

- India has also set an ambitious target to become a **US\$ 30 trillion economy by 2047.**
 - ♦ NITI Aayog's vision for Viksit Bharat **aims to elevate India to high-income status by its centenary of independence.**

NITI Aayog's 'Vision for Viksit Bharat @ 2047

- India must grow its GDP **ninefold** from the **current US\$3.36 trillion** and increase its per capita income **eightfold** from **US\$2,392 per annum** to reach developed nation status.
- **The paper identifies structural challenges** such as enhancing manufacturing and logistics and bridging rural-urban income disparities.
- It highlighted the need to balance energy security, access, affordability, and sustainability.
 - ♦ It also stressed the importance of improving industrial competitiveness to transform the agricultural workforce into an industrial one.

Classification of Countries by World Bank

- The World Bank's income classifications divide countries into **four categories** based on their **gross national income (GNI) per capita.**
 - ♦ **Low-Income Countries (LICs):** GNI per capita of \$1,145 or less
 - ♦ **Lower-Middle-Income Countries (LMICs):** GNI per capita between \$1,146 – \$4,515
 - ♦ **Upper-Middle-Income Countries (UMICs):** GNI per capita between \$4,516 – \$14,005
 - ♦ **High-Income Countries (HICs):** GNI per capita of more than \$14,005.
- The World Bank revises this classification every year on July 1 based on the latest **Atlas Method GNI per capita data.** The classification applies to all countries with a **population over 30,000.**

Middle Income Countries (Data World Bank)

- **Middle income countries** are home to 75% of the world's population and 66% of the world's poor.
 - ♦ At the same time, MICs represent about **one third of global GDP** and are responsible for 40% global economic output.
- Over the last 34 years, only 34 middle-income economies have transitioned to higher income levels, most countries were part of the **European Union.**
 - ♦ It also includes Saudi Arabia, Latvia, Bulgaria and South Korea.

Middle-income Trap

- **The World Development Report 2024** by the World Bank — calls attention to the phenomenon of the **"middle-income" trap.**
- It is described as a situation where **countries struggle to attain high-income status.**

- ♦ It was coined in **2007** by the World Bank to describe countries mostly in **Latin America and the Middle East** who, despite economic growth and falling poverty rates, were never able to become high-income countries.
- **Factors that contribute to this include:**
 - ♦ **Rising labor costs:** As wages increase, industries that depend on cheap labor relocate elsewhere, leaving the country without a new competitive edge.
 - ♦ **Declining competitiveness:** A lack of investment in higher-value industries, such as technology or advanced manufacturing, lead to economic stagnation.
 - ♦ **Insufficient innovation:** Without strong innovation ecosystems, countries fall behind in global competition.
- Currently, there are **108 countries** — including major economies like **China, Brazil, Türkiye and India** — stuck in the “middle-income trap”.
 - ♦ **Insufficient development of domestic innovation capabilities** is at the heart of the middle-income trap.

Challenges Faced by India

- **Innovation & Technology Adoption:** Low investment in R&D and innovation limits economic diversification.
- **Agriculture Dependence:** Large portions of the population are still dependent on low-productivity agriculture.
 - ♦ Employment is increasing in agriculture and in low-productive forms following the pandemic.
- **Slow Wage Growth:** According to the Periodic Labour Force Survey (PLFS), nominal wages for regular wage workers at the all-India level between April and June 2023-24 has only grown at around 5%, and that of casual workers at roughly 7%.
 - ♦ With an inflation rate of roughly 5% during this time, this implies that wage earners have seen little to no real wage growth.
- **Global Competition:** India faces stiff competition from other emerging economies seeking growth.

Way Ahead

- **Middle-income countries now face bigger challenges such as:** ageing populations, geopolitical and trade frictions, and the need to speed up growth without impacting the environment.
- A comprehensive innovation-focused strategy with strategic active policies is the only way to escape the middle-income trap.

Suggestions:

- ♦ Boosting innovation and technological development.
- ♦ Investing in human capital, particularly through education and skills development.
- ♦ Promoting industrialization, especially in high-value manufacturing and services.
- ♦ Improving infrastructure in underdeveloped regions.

Note: For Detailed Analysis about this you can refer our Daily News Decoded Video on [NEXTIAS Youtube Channel](#)

Source: IE

RBI'S LIQUIDITY INJECTION MEASURES

In News

- The **Reserve Bank of India (RBI)** has announced enhanced **liquidity measures** to address contraction in the banking system.

Steps Taken

- **Swap auction:** RBI will conduct a six-month USD/INR buy/sell swap auction worth \$5 billion, with the first leg on January 31, 2025.
 - ♦ This involves banks selling US dollars to the RBI in exchange for rupee funds, to be reversed after six months with a premium.
- **OMO Purchases:** The RBI will conduct open market operation (OMO) purchase auctions of Government Securities (G-Secs) totaling ₹60,000 crore in three tranches of ₹20,000 crore each on January 30, February 13, and February 20, 2025.
- **VRR Auction:** A 56-day Variable Rate Repo (VRR) auction for ₹50,000 crore will be held.
 - ♦ This is the first time such a long-tenor VRR auction is being conducted.

Need and Objectives

- The measures are expected to infuse around ₹1.50 lakh crore into the banking system in a phased manner, from January 30 to February 20, 2025, providing much-needed durable liquidity to address the liquidity deficit in the banking system.
 - ♦ The liquidity deficit was exacerbated by a sharp depreciation of the rupee and reduced government spending.
- The RBI's actions are in response to liquidity tightness due to tax outflows and limited government spending, with the liquidity deficit estimated at ₹3 lakh crore.

Challenges

- The government's over-borrowing and investing surplus cash could impact liquidity management, leading to prolonged surplus or deficit cash positions.
- This weak cash management could have negative consequences for RBI's debt management, liquidity, and overall monetary policy.

Suggestions and Way Forward

- The continued fiscal imbalance between surplus/deficit cash positions requires greater coordination between RBI and the government to prevent negative impacts on monetary and liquidity management.
- The RBI is committed to agile and flexible liquidity management to support economic stability.
- The recent measures highlight RBI's proactive approach to ensuring sufficient liquidity in the banking system to stabilize financial conditions.
- The RBI will monitor evolving liquidity and market conditions and adjust measures as needed to ensure orderly liquidity in the system.

Source :TH

INDIA TO DEVELOP ITS OWN AI LLM MODEL

Context

- The Indian government has decided to build a **domestic large language model** of its own as part of the Rs 10,370 crore **IndiaAI Mission**.

About

- It aims to build a homegrown AI system that understands India's unique culture, languages, and needs.
- The foundational model could take anywhere between 4-8 months.
- The government's AI compute facility would be "the most affordable" in the world.
- **Infrastructure:**
 - ♦ The government has selected 10 companies that will supply 18,693 graphics processing units or GPUs.
 - ♦ GPUs are high end chips needed to develop machine learning tools that can go into developing a foundational model. GPUs have become **essential for more complex tasks**, such as large-scale data processing and cryptocurrency mining.
 - ♦ The project also includes plans for AI data centres in Odisha.

- The idea is that institutions and researchers use GPUs and bring in innovations.
 - ♦ Since these GPUs are available now, students and researchers can make models on a large-scale instead of working in an ad hoc manner.

India AI Mission

- Over the next five years, it will support the initiatives like the IndiaAI Compute Capacity, IndiaAI Innovation Centre (IAIC), IndiaAI Datasets Platform, IndiaAI Application Development Initiative, IndiaAI FutureSkills, IndiaAI Startup Financing, and Safe & Trusted AI.
- **Aim:** Establishing a public-private partnership model aimed at nurturing India's AI innovation ecosystem.
- These initiatives aim to bolster **India's global leadership in AI**, foster technological self-reliance, ensure ethical and responsible AI deployment, and democratize the benefits of AI across all strata of society.

Large Language Models (LLMs)

- They are a category of foundation models **trained to understand and generate human language**.
- These models are built on **deep learning techniques** allowing them to process and generate text in a coherent, contextually appropriate manner.
- LLMs are used for various tasks, including text generation, language translation, and summarization.

Significance

- The initiative is a key part of India's plan to become a leader in AI and reduce reliance on foreign technology.
- It will ensure that the LLM is free from any biases and truly reflects the country's diversity.
- By building its own AI, India can ensure data security, better support for local languages, and greater control over how AI is used in the country.

Source: IE

NEWS IN SHORT

MUHAMMAD IQBAL

In News

- The **Beating Retreat Ceremony** at Vijay Chowk concluded with **Muhammad Iqbal's 'Saare Jahan Se Achha'**.

Muhammad Iqbal

- He is also known as **Allama Iqbal (a title given to Islamic scholars)**.
- Born in Sialkot, he was an **influential philosopher, poet, and politician**.
- He studied in Europe and later became a prominent figure in **Indian and Muslim philosophy**.
 - ♦ He is regarded as the ideological father of Pakistan, his work gained prominence in both India and Pakistan.
- Sarojini Naidu had called Iqbal the **'poet laureate of Asia'**.
- **Literary works** : His work, particularly **'Saare Jahan Se Achha'**, was adopted as a symbol of unity during India's independence struggle.
 - ♦ He is awarded a knighthood for works like **Bang-e-Dara and Rumuz-e-Bekhudi**.
 - ♦ **Javidnama** is a spiritual journey under the guidance of Rumi.
 - ♦ **'Lab Pe Aati Hai Dua'** continues to be popular in schools.
- **Controversy Around Legacy:** Iqbal's 1930 speech on the two-nation theory and his support for Muhammad Ali Jinnah has led to mixed perceptions, especially in India.
 - ♦ Some controversies have arisen, such as recent protests over students reciting Iqbal's poems, with some groups calling them "anti-national."
 - Despite this, Iqbal remains an influential figure in both Indian and Pakistani thought.

Do you know ?

- **'Saare Jahan Se Achha'** is a patriotic poem originally written by Iqbal in 1904 as Tarana-e-Hindi (Urdu poem).
- It eulogizes Hindustan (India, Pakistan, Bangladesh), with the famous lines "Saare jahan se achha, Hindustan hamara" meaning "Better than the entire world is our Hindustan."
- The poem became a symbol of resistance during British rule and was later set to a faster tune by **Pandit Ravi Shankar**.

Source :IE

KURDISTAN REGION

In News

- India has sent a shipment of medical supplies, including bronchodilators, inhalers, and ventilators, to support the residents of the Kurdistan region in Iraq.

Strategic Importance of India's Aid

- Enhances India's humanitarian **outreach in West Asia**.
- **Strengthens healthcare diplomacy** and goodwill in a geopolitically sensitive region.
- Reinforces India's commitment to global disaster relief and medical support.
- Example of India being as a **'Vishwabandhu Bharat', or a global friend**

About Kurdistan Region



The Economist

- **Country:** Iraq (semi-autonomous region).
- **Capital:** Erbil.
- **Governorates:** Erbil, Sulaymaniyah, Dohuk, Halabja.
- **Neighbouring Nations:** Shares borders with Turkey, Iran, Syria, and Iraq-controlled territories.
- **Political Structure:** The Kurdistan Regional Government (KRG) operates autonomously.
 - ♦ Tensions exist with Iraq's central government over resource control and autonomy.
- **Mountains:** Zagros Mountains dominate the landscape, forming natural borders with Iran and Turkey.
- **Rivers:** The Tigris and Greater Zab Rivers support agriculture and settlements.

Source: DD News

HUMAN AFRICAN TRYPANOSOMIASIS

Context

- The World Health Organization (WHO) has announced that **Guinea** has successfully eliminated the **Gambiense form of Human African Trypanosomiasis (HAT)**.

About

- It is also known as **sleeping sickness**, and has become the **first neglected tropical disease** to be eliminated in the country.
 - ♦ Neglected tropical diseases are a group of mostly infectious diseases that thrive among **resource-poor populations**, especially in **tropical climates**.
- The announcement was made on the **global observance of Neglected Tropical Diseases Day** which is marked on **January 30**.
- **So far, seven countries** have been validated by WHO for eliminating the **gambiense form of HAT**: Togo (2020), Benin (2021), Côte d'Ivoire (2021), Uganda (2022), Equatorial Guinea (2022), Ghana (2023), and Chad (2024).
- **The rhodesiense form of the disease** has been eliminated in one country only, **Rwanda**, in 2022.

Human African Trypanosomiasis

- HAT is caused by **trypanosome parasites** that are transmitted by **tsetse flies**.
- HAT is found only in **sub-Saharan Africa**.
 - ♦ Two subspecies of *Trypanosoma brucei* cause disease: *T. b. gambiense* in West and Central Africa, and *T. b. rhodesiense* in East Africa.
- **Symptoms**: Fever, headaches, and joint pain, confusion, disrupted sleep, and behavioural changes.
 - ♦ If left untreated it can be fatal.
- Transmission can be interrupted by **depleting the parasite reservoirs** through detection and **treatment of infected people and/or domestic animals**.
- There is **no vaccine for African trypanosomiasis**.

Source: DTE

LEPROSY ELIMINATION

Context

- The Union Health Ministry is looking at a **more targeted approach to containing leprosy in India**.

About

- **The five states in India** with the highest prevalence of leprosy are **Bihar, Chhattisgarh, Jharkhand, Maharashtra, and Odisha**.

- The Union Health Ministry launched the **National Strategic Plan (NSP) and Roadmap for Leprosy (2023-27) in 2023**, to achieve zero transmission of leprosy by **2027**.
 - ♦ The Sustainable Development Goal (SDG) 3.3 aims to end leprosy by **2030**.
- The World Health Organization (WHO) declared **Jordan** as the first country in the world to eliminate leprosy in 2024.

Leprosy

- Leprosy is also known as **Hansen's disease**, it is a chronic infectious disease caused by a type of **bacteria, Mycobacterium leprae**.
- It is known to occur at **all ages** ranging from early childhood to old age.
- **Symptoms**: The disease predominantly affects the skin and peripheral nerves.
 - ♦ Loss of sensation in affected areas.
 - ♦ Left untreated, the disease may cause **progressive and permanent disabilities**.
- **Transmission**: Through droplets from the nose and mouth.
 - ♦ The disease is **not spread through casual contact** with an infected person.
- **Treatment**: Leprosy is a **curable** disease through the multi-drug therapy (MDT).

Source: TH

TEESTA BRIDGE

In News

- The West Bengal government has approved the **Teesta bridge project** after over 10 years.

About Teesta Bridge

- After the state government gave its nod, the Centre has approved Rs 1,100 crore for the project and will link **Sikkim and West Bengal**.
- The Coronation Bridge, the existing bridge over the Teesta, was built in the memory of **King George VI and Queen Elizabeth** from 1937 to 1941. At that time, its construction cost over Rs 1 lakh. Its foundation stone was laid by then Bengal Governor John Anderson.
 - ♦ but it was damaged in the 2011 earthquake.
- **Now the new bridge** will boost tourism and serve strategic purposes, particularly for military connectivity to the **China and Bhutan borders**.
 - ♦ The **Doklam standoff in 2017** highlighted the need for a new bridge to secure the route for military operations.

Do you know ?

- The **Teesta river** originates from **Tso Lhamo Lake in north Sikkim** at an elevation of about 5,280 meters.
- The river travels through Sikkim, West Bengal, then enters Bangladesh at Mekhligunj.
- It flows another 140 km in Bangladesh before joining the Bay of Bengal.
 - ♦ 83% of the Teesta's catchment area lies in India, and the remaining 17% is in Bangladesh.
- It is a **tributary of the Brahmaputra river**.

Source :TH

TANNERY POLLUTION IN PALAR RIVER

In News

- The Supreme Court has strongly condemned the unregulated discharge of untreated effluents **from tanneries in Vellore, Tamil Nadu, into the Palar river**, likening the environmental damage to an **"ecocide."**

Supreme Court's Directives

- **Compensation to affected families:** The Tamil Nadu government must distribute compensation fixed in 2001 by the Loss of Ecology Authority to over 29,000 affected families in Vellore.
- **'Polluter Pays' Principle:** The government and tannery owners are held responsible for the damage caused.
- **Formation of an Expert Committee:** For conducting audit and maintaining a healthy environment.

Tannery Pollution & Its Impact

- Tamil Nadu houses **45% of India's tanneries**. 50% of chemicals in leather processing turn into wastewater or sludge.
- **India produces 13% of global leather** and Tannery wastewater contains harmful pollutants like Suspended solids, nitrogen, sulphate, sulphide, chloride.
- Pollutants further increase the **Biological Oxygen Demand (BOD)** in Palar River.
 - ♦ BOD measures the amount of oxygen required by microorganisms to decompose organic matter in water.

Source: TH

AXIOM MISSION 4

Context

- ISRO astronaut Shubhanshu Shukla will serve as a pilot on the **Axiom Mission 4 to the International Space Station (ISS)**.

About

- He will be the **first Indian astronaut** to reach the **International Space Station (ISS) on a private mission**.
- He became **only the second Indian to go to space** after Wing Commander Rakesh Sharma in **1984**.
- He is elected as an astronaut-designate for **India's Gaganyaan mission** (tentatively scheduled for 2026).

Axiom Mission 4

- Axiom Mission 4 (or Ax-4) is a **private spaceflight to the International Space Station to be launched in April 2025**.
- **Duration:** Up to 14 days.
- **Countries:** USA, India, Poland, and Hungary.
 - ♦ It is the first government-sponsored spaceflight in over 40 years for Poland & Hungary.
- **Objectives:** The astronauts will execute a mission that includes outreach, scientific, and commercial operations during their 14-day stay in orbit.
- **Significance:**
 - ♦ Each participating country can build on this experience for future missions.
 - ♦ It will create new pathways for low-Earth orbit missions.
 - ♦ Strengthens global partnerships in space research and exploration.
 - ♦ It is a valuable experience for Gaganyaan.
 - ♦ Strengthens ISRO's collaboration with NASA and private space entities.

Note: For Detailed Analysis about this you can refer our Daily News Decoded Video on [NEXTIAS Youtube Channel](#)

Source: BS

ATMOSPHERIC RIVER

In News

- The Atmospheric River named **"Pineapple Express"** heads for North America. Pineapple Express is a type of atmospheric river that

transports warm, humid air from Hawaii to the U.S. West Coast.

What are Atmospheric Rivers (ARs) (also called Flying Rivers)?

- **Definition (NOAA):** Long, narrow corridors in the atmosphere that transport large amounts of water vapor outside the tropics—like rivers in the sky.
- **Formation:** ARs are part of the larger extratropical cyclone system, moving heat and moisture from the tropics toward the poles.
 - ◆ Typically found within low-level jets (strong winds in the lower atmosphere).
- **Freshwater Transport:** ARs are the largest transport mechanisms of freshwater on Earth.
 - ◆ They account for 90% of moisture transfer from the tropics to higher latitudes.

Impact of Atmospheric Rivers

- **Weak ARs:** Bring much-needed rain and snow, replenishing water sources.
- **Strong ARs:** Can cause extreme rainfall, floods, mudslides, and destruction.
 - ◆ Example of Destructive ARs: California's "Pineapple Express" brings torrential rain and flooding.
 - ◆ 2013 Uttarakhand floods and 2018 Kerala floods in India were linked to AR activity.

Source: BBC

POLAR BEAR FUR & FOREVER CHEMICALS

In News

- A recent study revealed that polar bear fur

contains an **oily substance (sebum)** that helps them stay dry despite sliding on ice and diving into water.

About sebum

- Sebum is similar to the fluorinated coatings used on skis, which help them glide on ice but contain harmful **"forever chemicals" (Per- and polyfluoroalkyl substances (PFAs))**.
 - ◆ Sebum could potentially be used to develop environmentally friendly alternatives to PFAs in coatings.

About Polar Bears

- They are the largest bears in the world and top predators of the Arctic.
- Their Latin name, **Ursus maritimus**, meaning "sea bear," reflects their life spent predominantly on sea ice in the Arctic.
- **Characteristics** : Polar bears are skilled swimmers, capable of reaching speeds of six miles per hour, and have thick fat layers and water-repellent fur to insulate them from the cold.
 - ◆ They spend over 50% of their time hunting, primarily for seals, as they require large amounts of fat for survival.
- **Habitat:** Polar Bears occur at low densities throughout the circumpolar Arctic and are more abundant in shallower, ice-covered waters associated with the continental shelf
- **Distribution** : The species is found in Canada, Greenland/Denmark, Norway, Russian, United States (Alaska).
- **Importance** : Polar bears are at the top of the food chain and have an important role in the overall health of the marine environment.
 - ◆ The loss of sea ice habitat is the biggest threat

