

31st Jan, 2025

1. Axiom-4 Mission (Ax-4) GS 3 (Science and Tech)

- **Why in News:** Shubhanshu Shukla, an Indian Air Force (IAF) officer and ISRO astronaut, was recently named the pilot for Axiom Mission 4 (Ax-4)
- **About Axiom-4 Mission (Ax-4):**
 - Ax-4 is the fourth private astronaut mission to the **International Space Station (ISS)**.
 - It is organized by **Axiom Space** in collaboration with
 - The Ax-4 crew will launch aboard a **SpaceX Dragon spacecraft** to the ISS from NASA's Kennedy Space Center in Florida.
 - Once docked, the private astronauts plan to **spend up to 14 days aboard the ISS**.
 - During their time aboard the ISS, the crew will **conduct scientific experiments**, perform **technology demonstrations**, and engage in **educational outreach**.
 - Research areas include materials science, biology, Earth observation and more, with the potential to yield groundbreaking discoveries and innovations.
 - The mission will send the **first Indian astronaut to the station** as part of a joint effort between NASA and the Indian space agency.
 - The private mission also carries the **first astronauts from Poland and Hungary to stay aboard the ISS**.

Shubhanshu Shukla to pilot NASA's Axiom-4 mission to ISS

The Hindu Bureau
BENGALURU

Indian astronaut Group Captain Shubhanshu Shukla will be the pilot of the upcoming Axiom-4 mission to the International Space Sta-

tion (ISS).

Mr. Shukla, who is also one of the four astronaut-designates selected for Gaganyaan mission, will become the first Indian astronaut to go to the ISS. The mission will be launched from Florida.

2. The Yamuna Crisis - Beyond Politics GS 3 (Environment)

- **Why in News:**
 - The issue of the **Yamuna river's contamination** has turned into a **political controversy**, with Ex. Delhi Chief Minister accusing Haryana of polluting Delhi's water supply.
 - As legal battles ensue and the Election Commission intervenes, it is essential to **examine the health of the Yamuna beyond political rhetoric**.
- **Key Issues Related to the Yamuna:** Three major concerns regarding the Yamuna and Delhi's water supply are:
 - Drinking Water Supply
 - Pollution
 - Environmental Flow
- **Drinking Water Supply:**
 - **The supply challenges:**
 - Delhi's drinking water comes primarily from **Haryana**, with major inlets at Wazirabad Barrage, which depends on releases from Haryana's Hathni Kund Barrage.
 - Delhi's treatment plants (Wazirabad, Chandrawal, Okhla, Haiderpur, and Bawana) rely entirely on Haryana's water supply.
 - **Water shortages** arise during **lean seasons**, forcing plant shutdowns and leading to supply of untreatable water and water scarcity crisis.
 - **The ammonia issue in Delhi's water:**
 - Ammonia, a colorless gas with a sharp odor, dissolves in water and is widely used in industries, fertilizers, and cleaning agents.
 - It enters water bodies through **industrial effluents, agricultural runoff, and untreated sewage**.

Why Yamuna in Delhi has high ammonia levels

SOPHIA MATHW
NEW DELHI, JANUARY 30

DAYS AFTER AAP national convener Arvind Kejriwal accused the BJP-led Haryana government of deliberately "poisoning" Delhi's water supply, the Haryana government lodged a complaint against Kejriwal on Wednesday.

On Tuesday, Delhi Chief Minister Arvind Kejriwal and Punjab CM Bhupinder Singh Mani met Election Commission officials and alleged that the Haryana government was deliberately releasing large amounts of ammonia into the Yamuna.

What is ammonia?
Easily dissolvable in water, ammonia is a

colourless, gaseous chemical with a sharp odour. It is widely used in animal feed production, plastic and paper manufacturing, and as a fertiliser, coolant, cleansing agent, and food additive, according to the World Health Organization (WHO).

Major sources of ammonia pollution include runoff from farmlands, effluents from industries where ammonia is used, and untreated sewage. The chemical is also naturally released in water with the degradation of organic matter. In the long term, ammonia in human bodies can cause damage to internal organs due to its corrosive properties.

Why is ammonia an issue in Delhi?
Dye units, distilleries and other factories

concentrated in the Panipat and Sonapat districts of Haryana, as well as sewage from residential colonies, are believed to pollute the stretch of the Yamuna before it enters Delhi at Wazirabad. As a result, several quality parameters are impacted, including dissolved oxygen in the water — which reaches zero in the Delhi stretch of the river. The situation worsens in the dry, winter months due to the absence of freshwater upstream.

Water treatment plants cannot treat water with ammonia contents of more than one part per million (ppm). A spike in ammonia levels thus disrupts the capital's water supply.

How is ammonia in water treated?
The Delhi Jal Board's water treatment

plants use chlorine to treat excessive ammonia. According to officials, 11.5 kg of chlorine is needed per litre of water per hour to neutralise one ppm of ammoniacal nitrogen.

Some amount of chlorine should remain in the treated water after the treatment process so that pathogens can be neutralised. As the ammonia levels increase in winter, the efficiency of the water treatment plants reduces, according to the Delhi Jal Board.

For years now, the Delhi and Haryana governments have failed to devise a long-term solution to resolve the issue of excessive ammonia in water. Delhi proposed an in-situ ammonia treatment plant at the Wazirabad pond in March 2023. However, it remains under development.

- High ammonia levels in the Yamuna, caused by industrial discharge from **Panipat** and **Sonipat** and sewage from colonies, impact water quality by reducing **dissolved oxygen**.
- Water treatment plants in Delhi **cannot process ammonia levels above 1 part per million (ppm)**, leading to disruptions in the capital's water supply.
- **How is ammonia-laden water treated?**
 - The Delhi Jal Board (DJB) uses **chlorine** to neutralize ammonia in water treatment plants.
 - Approximately 11.5 kg of chlorine is needed per litre of water per hour to counteract one ppm of ammoniacal nitrogen.
 - **Efficiency of treatment plants** drops in winter due to increased ammonia levels.
- **Government actions on ammonia contamination:**
 - A long-term solution has yet to be implemented by Delhi and Haryana governments.
 - In March 2023, Delhi proposed an **in-situ ammonia treatment plant** at Wazirabad, but it remains under development.
 - Haryana has not completed laying pipelines to prevent pollutant mixing in the river.
- **Pollution - A Lingered Threat:**
 - Apart from ammonia contamination, **multiple factors contribute to Yamuna's pollution:**
 - **Unregulated sewage discharge:** Sewage flows into stormwater drains due to incomplete sewer connections in unauthorized colonies.
 - **Industrial waste:** Unlicensed household industries discharge untreated effluents.
 - **Solid waste dumping:** Illegal dumping continues despite regulations.
 - **Key findings and unfulfilled commitments:**
 - The National Green Tribunal's **Yamuna Monitoring Committee (YMC)** (2018–2021) identified **16 major polluters**, including Delhi Jal Board and authorities from Haryana and Uttar Pradesh.
 - The Najafgarh, Supplementary, and Shahdara drains are major contributors to pollution.
 - Haryana had committed to setting up Sewage Treatment Plants (STPs) but failed to implement them fully.
 - **Delhi's Interceptor Project** aimed at treating sewage before discharge has seen partial success but remains ineffective due to incomplete execution.
- **Environmental Flow - The Need for Sustained Water Levels:**
 - The National Institute of Hydrology (NIH) study highlighted that **excessive water withdrawals** upstream **drastically reduce Yamuna's flow through Delhi**.
 - Reduced flow **increases pollutant** concentration and disrupts aquatic life.
 - The YMC recommended revisiting the 1994 water-sharing agreement between Delhi, Haryana, Himachal Pradesh, Rajasthan, and Uttar Pradesh for fairer water distribution.
 - **Regulatory intervention** by the central government or courts is necessary to ensure a sustainable environmental flow.
- **Conclusion - The Need for Political Will and Action:**
 - While reports and recommendations exist, **implementation remains weak due to political and bureaucratic inertia**.
 - Unless policymakers, engineers, and administrators take decisive action, neither political promises nor manifestos will have any real impact.
 - Citizens must recognize the gravity of the crisis and **demand accountability** to ensure the Yamuna's **restoration and sustainable management**.

3. Mahakumbh Stampede: Understanding the Causes and Strategies for Prevention

Recent event of importance

• Why in News:

- A stampede at the Mahakumbh Mela in Allahabad on January 29 claimed several lives. UP CM attributed the tragedy to the overwhelming crowd gathering for Mauni Amavasya.

- The National Disaster Management Authority (NDMA) had in 2014 published a report on crowd management at big events and prevention of stampedes. The report said, **“Majority of the crowd disasters in India and developing countries have occurred at religious places.”**

• Causes of Stampedes

- Stampedes can result from multiple factors, including structural weaknesses (poor barricading, weak guardrails, narrow exits, inadequate lighting), fire or electrical failures, poor crowd control, and lack of coordination among stakeholders.
- **Failures in Crowd Control**
 - The NDMA report highlights key reasons for crowd control failures, such as:
 - Underestimation of expected crowd size
 - Exceeding venue capacity
 - Limited holding areas before entry
 - Locked or closed exits
 - Weak railings and lack of queue management
 - Absence of sectoral partitions to regulate movement
 - **Consequences of Poor Management**
 - Inadequate arrangements often trigger panic or excitement, leading to overcrowding or rapid movement.
 - This, in turn, results in crushing, suffocation, and trampling.
 - The report identifies compressive asphyxia as the leading cause of fatalities in such disasters.

• Role of Crowd Behaviour in Stampedes

- Understanding crowd behaviour is crucial for preventing stampedes.
- The actions of a few individuals can influence many, sometimes leading to panic or disorder.
- A community-based approach to crowd control is more effective than force-based methods.
- **Impact of Overcrowding**
 - At many events, demand exceeds available space, leading to overcrowding.
 - To manage this, **input control**—such as restricting entry through a mandatory registration process—can help regulate the crowd.
- **Risks of Poor Crowd Management**
 - Long wait times may prompt individuals to climb fences, causing others to follow and leading to congestion in another area.
 - Additionally, poorly executed control measures, such as police chasing unruly groups toward an incoming crowd, can create dangerous collisions, worsening the situation.

• Past Stampede Incidents

- The NDMA report references several past stampedes, including:
 - **Nashik Kumbh (August 2003):** 29 pilgrims died due to overcrowding at barricades, sudden reverse crowd flow, sadhus moving in procession with pilgrims, and unforeseen influx of pilgrims at various points.

Managing crowds at religious gatherings: learnings from an NDMA study

DEEPTI MANI TAWARI
NEW DELHI, JANUARY 30

A STAMPEDE at the Mahakumbh Mela on Wednesday left at least 30 people dead and 40 injured. Uttar Pradesh Chief Minister Yogi Adityanath said the administration was overwhelmed by the huge crowds moving towards the Sangam Ghat at the same time.

A report published in 2014 by the National Disaster Management Authority (NDMA), the apex body for formulating disaster mitigation policies in the country, found that the “majority of the crowd disasters in India and developing countries have occurred at religious places”.

What causes stampedes?
Stampedes can be caused by structural reasons (including weak temporary structures, poor barricading, poor guardrails, poorly lit stairwells, narrow exits, etc.), fires or electrical failures, inadequacies in crowd control, crowd behaviour, poor security, and lack of coordination between stakeholders.

According to the NDMA report, crowd control is key to avoiding stampedes. Crowd control can fail due to several reasons: the amount of larger than anticipated crowd, allowing people to occupy a venue’s holding capacity, limited holding areas before the entrance, lack of access control, closed locked exits, lack of adequate and strong railings to mark the queue, lack of sectoral partitions to segregate assembled crowds, etc.

According to the report, improper/ inadequate arrangements add to the problem. Panic or excitement leads to either overcrowding or accelerated movement. “Excitation, this has led to deaths because of crushing, suffocation, and trampling. Compressive asphyxia has been the most common reason for deaths...”, the report says.

What role does crowd behaviour play?
According to the report, understanding crowd behaviour is an important aspect of preventing stampedes. “Individual behaviour in a crowd is sometimes influenced by the behaviour of others. The unlawful actions of a few people can result in larger numbers following them. Research has shown that understanding of crowd behaviour has led to a community-based approach to crowd control instead of force-based control”, the report says.

Long waits at places of worship may “result in a few desecrating climbing up the fences which could lead to a large number following them causing overcrowding in another area”. Inappropriate or poorly managed crowd procedures may worsen the situation. The example, police reacting to a group of unruly people may cause them to act in a disruptive manner to the incoming crowd, which may create collisions, and hence a disaster”, it says.

What does the report say about past incidents?
The report makes a reference to the August 2003 stampede at the Nashik Kumbh, where 29 pilgrims died. According to the report, a religious inquiry found these reasons for the stampede: the presence of people at various points on the barricades, a sudden flow of people in the reverse direction, sadhus were allowed to move in procession on elephants and in procession with pilgrims, and unforeseen ingress of pilgrims onto the path from various points.

Following the stampede at the Kumbh Mela, the report says, “At Nashik, in January 2005, in which 29 people were killed, an inquiry commission under Justice Rajan Kishor found the following causes: ‘Wrong crowd estimates (More pilgrims expected because of Tuesday); Temple compound not big enough to hold large number of pilgrims; Narrow, steep, wet (slippery), winding path with (illegal) vendors (some having gas cylinders) on both sides; Illegal electric connections; Inadequate safety security (no watchtowers, public address system); Fire, water and medical assistance; Poor infrastructure (only plans, no implementation); Lack of coordination among various stakeholders.’”

How does crowd control work?
The NDMA report argues that most stampedes can be prevented with proactive and holistic planning, and flawless execution. “The guiding principle for crowd control should be managing the demand supply gap through controlling the crowd inflow, i) regulating the crowd at the venue, and ii) controlling the outflow. If needed”, the report says.

In order to understand demand, the report says, the authorities need to understand the history of numbers, crowd arrival patterns, type of visitors, etc., and in order to understand the supply, authorities need to calculate the capacity at the venue—things like existing capacity and offering of prayers possible per hour.

“A number of places demand simply outstrip supply, leading to overcrowding. Because of this, there is a need for an input control i.e., restricting the number of entrants. A mandatory registration process makes this possible”, the report says.

Giving the examples of shirats at Varanasi and Sabarimala, the report says a lot of places have started online registration of pilgrims. “This registration process could be used to influence the arrival pattern”, it says.

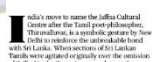
The report says that at a number of places, it is impossible to increase supply capacity because of religious beliefs or topographical reasons. In such cases, since the wait is unavoidable, the only possibility is to make it comfortable.

- **Kalubai Yatra Mandhardevi (January 2005):** 293 people were killed due to wrong crowd estimates, inadequate temple space, narrow, slippery paths with illegal vendors, lack of safety measures, and poor infrastructure.
 - **Causes Identified in Investigations**
 - **Nashik Kumbh:** The stampede was triggered by crowd pressure at barricades and the unplanned movement of pilgrims and sadhus.
 - **Kalubai Yatra:** Causes included inaccurate crowd estimates, narrow paths, illegal activities, lack of safety and medical facilities, and poor coordination between stakeholders.
- **Proactive Planning for Crowd Control**
 - The NDMA report stresses that most stampedes can be avoided with proactive planning and effective execution. It outlines a **holistic approach** that includes:
 - Controlling the crowd inflow
 - Regulating the crowd within the venue
 - Managing the crowd outflow
 - **Understanding Demand and Supply**
 - To manage demand, authorities must analyze:
 - Historical crowd data
 - Arrival patterns and peak times (e.g., festivals, holidays)
 - Advance registration and ticketing systems
 - Public transport schedules
 - For supply management, the venue's capacity must be calculated to avoid overcrowding.
 - **Role of Online Registration**
 - Examples from Vaishnodevi and Sabarimala show that **online registration** can help manage crowd arrivals and influence patterns.
 - **Dealing with Limited Supply Capacity**
 - In places where increasing supply is not feasible due to religious beliefs or geography, authorities should focus on making waiting times more comfortable for visitors.
- **Importance of Infrastructure and Information in Crowd Control**
 - The report highlights the need for **adequate infrastructure** for crowd management at religious sites.
 - It recommends setting up **staging points** for visitors, equipped with necessary facilities like rest areas, food, water, and hygiene. These points should be monitored effectively.
 - The report also emphasizes the role of **information management** and the need for effective **dissemination of information** to guide visitors and maintain order.

4. An Opportunity to Settle Sri Lanka's Ethnic Problem GS 2 (International Relations)

- **Why in News:**
 - **India's decision to name the Jaffna Cultural Centre after the Tamil poet-philosopher Thiruvalluvar is a symbolic move that underscores its deep historical and cultural ties with Sri Lanka.**
 - **This gesture not only acknowledges the Tamil heritage but also serves as a diplomatic tool to reinforce India's influence in Sri Lanka, particularly among the Tamil-speaking population.**

An opportunity to settle Sri Lanka's ethnic problem



T. Harshadharan

India's move to name the Jaffna Cultural Centre after the Tamil poet-philosopher Thiruvalluvar is a symbolic gesture by New Delhi to reinforce the unbreakable bond with Sri Lanka. When sections of Sri Lankan Tamils were agitated originally over the renaming of Jaffna to the Centre's nomenclature, the Indian authorities were swift in their course correction. It is now called the 'Jaffna Thiruvalluvar Cultural Centre', a recent landmark, built by the Indian government. No one needs to emphasise the significance of bilateral ties between the two south Asian neighbours, which have a shared history and culture.

In the last 60 odd years, the nature of political relations has undergone significant changes ever since the 1962 anti-Tamil pogrom in Sri Lanka drove India to play the role of a mediator, initially, and that of an active player, later, in the attempt to resolve the vexatious ethnic problem. It was such a complex relationship that led to the signing of the Indo-Lanka Accord of 1987 and the consequent 13th Amendment (13A) to Sri Lanka's Constitution, creating a new system of government — Provincial Councils — and granting a limited autonomy. At the time, the Internal Security (Emergency) Powers (1978) — the party to which Sri Lanka President J.R. Jayawardene belonged — was among those which opposed the Accord and the Amendment. According to critics, the two were considered to be impositions of India on Sri Lanka.

The Liberation Tigers of Tamil Eelam (LTTE), which was another critic and from the most important Tamil force, was not happy with the ethnic framework. The LTTE was for the division of Sri Lanka and the creation of a Tamil Eelam encompassing the Tamil majority Northern and Eastern provinces, an idea that India can never agree with.

India's nodges on 13A

Despite the passage of over 30 years, the crucial Amendment has not been brought into effect, especially in the Tamil-speaking area of Sri Lanka, even though the Provincial Councils, there in most parts of the country, functioned between 1988 and 2006.

Successful Indian leaders have been urging their Sri Lankan counterparts for the 'swift, full or effective implementation' of 13A. In fact, when India's External Affairs Minister S. Jaishankar met

to the local authorities may take place sooner rather than later.

There is nothing wrong in holding the elections to the local bodies, which have a much longer history in Sri Lanka than the provincial councils. However, the rulers should be under no illusion that however efficient they may be, local bodies are no substitutes for the provincial councils. As in many other countries, the local self-governments in Sri Lanka are not hardly equipped to solve all the problems being thrown up by growing urbanisation on the one hand and other issues such as limited access of own resources and high dependence on local handouts on the other. This is why the layer of provincial councils becomes essential to address many of the issues.

It was not without reason that the interim report of the Steering Committee of the Constitutional Assembly, in September 2007, pointed to the wide consensus among Chief Justices, Provincial Councils, and various panels of the Assembly, that provisions be recognised as the primary aim of devolution.

The people and a deal

It is true that the P.P.'s leaders, since the Provincial Councils as a creation of India, as, after all, any constitutional structure, in the contemporary period, is an outcome of politics. This holds good for the Accord and 13A too, which were produced through an evolutionary process that involved the creation of a number of proposals at different levels in the form of the Constitutional Commission of 1972 and 1978 — were drafted, based on the British, American and French systems of government. The ruling coalition would do well to keep in mind that the people of Sri Lanka, known for their democratic spirit and effecting the transition of power smoothly through the ballot box, deserve a deal that is in tune with their character.

The 1978, which commands a two-thirds majority in Parliament with an extremely popular President, has the golden opportunity now to find a durable and lasting solution to the ethnic problem, which is an offspring of a combination of economic and political factors.

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- However, beyond the cultural significance, **the relationship between the two nations has been shaped by decades of political complexities**, particularly regarding the Tamil issue and the implementation of the **13th Amendment (13A) to Sri Lanka's Constitution**.
- **Historical and Political Context of 13th Amendment and India's Stance**
 - **Historical and Political Context of 13th Amendment**
 - India's involvement in Sri Lanka's Tamil issue dates back to the **1983 anti-Tamil pogrom**, which led to its role as a mediator and later as an active player in resolving the ethnic conflict.
 - This culminated in the **Indo-Lanka Accord of 1987**, which resulted in the **13th Amendment**, introducing **Provincial Councils with limited autonomy**.
 - However, the **amendment has remained a contentious issue**, facing resistance from both Sinhalese nationalist groups and Tamil separatist forces.
 - **The Janatha Vimukthi Peramuna (JVP)**, the party of Sri Lankan President Anura Kumara Dissanayake, has **traditionally opposed 13A**, viewing it as an **imposition by India**.
 - **Similarly, the Liberation Tigers of Tamil Eelam (LTTE)**, though advocating Tamil autonomy, **rejected the amendment as inadequate**.
 - **India's Stance on the 13th Amendment**
 - Despite over 35 years since its introduction, **the full implementation of 13A remains elusive, especially in Tamil-majority areas**.
 - **Successive Indian governments** have consistently **urged Sri Lanka to implement the amendment fully**.
 - However, **recent developments, such as Indian Prime Minister Narendra Modi's omission of any direct mention of 13A** during Sri Lankan President Dissanayake's visit in December 2024, **have raised questions about whether India is shifting its stance**.
 - While Foreign Minister S. Jaishankar reiterated India's call for devolution, Modi's silence suggests a possible recalibration of India's approach, potentially influenced by Sri Lanka's evolving domestic politics.
- **Sri Lanka's Political Landscape and Devolution Debate**
 - **The JVP and the NPP's Stance on Devolution**
 - A critical factor shaping the debate on devolution today is the stance of the JVP, a left-wing nationalist party that has historically opposed 13A.
 - The party, **which played a significant role in two armed uprisings (in 1971 and 1987-89)**, viewed the Indo-Lanka Accord and its resulting constitutional amendment as an **infringement on Sri Lanka's sovereignty**.
 - This position has persisted even as the JVP evolved into a mainstream political force.
 - Currently, **the JVP leads the National People's Power (NPP) coalition**, which has emerged as a dominant political force in Sri Lanka.
 - **President Anura Kumara Dissanayake**, who hails from the JVP, **has not explicitly stated whether his government will fully implement 13A**.
 - During his 2024 parliamentary election campaign in Jaffna, **he largely avoided discussing the issues of power devolution and a political settlement for the Tamils**, raising concerns that his administration may not prioritize Tamil autonomy.
 - **The Ambiguity in the NPP's Constitutional Promises**
 - The **NPP's 2024 election manifesto promised to draft a new constitution** that strengthens democracy and ensures equality for all citizens.
 - However, **it did not explicitly mention greater autonomy for the Tamil-majority Northern and Eastern provinces**.
 - Instead, it **proposed a "devolution of political and administrative power to every local government, district, and province"**, suggesting a broader but less concrete approach to decentralisation.

- The **manifesto also committed to holding provincial and local government elections within a year**, a crucial step given that provincial councils have been defunct since 2019.
- However, **it remains unclear whether these elections will lead to meaningful devolution or if they will merely reinforce existing administrative structures** without addressing Tamil political demands.
- **The Risk of Local Government Supplanting Provincial Councils**
 - One of the key debates in Sri Lanka's devolution discourse is **whether local government bodies can serve as an alternative to provincial councils**.
 - Local bodies, such as municipal and district councils, have a much longer history in Sri Lanka than provincial councils and are responsible for grassroots governance.
 - However, **they lack the financial and administrative capacity** to address broader regional challenges, **particularly in the Tamil-majority areas**, which continue to struggle with post-war reconstruction and economic underdevelopment.
 - **The fear among many Tamil leaders is that the government may prioritise strengthening local government institutions while ignoring provincial councils**, thereby sidestepping the core issue of regional autonomy.
 - Unlike provincial councils, which were established as a direct outcome of 13A, **local bodies function under a different administrative framework with limited powers**.
 - **If the government focuses only on local bodies** without empowering provincial councils, **Tamil aspirations for meaningful self-governance may remain unfulfilled**.
- **The Role of Sinhalese Nationalism in the Devolution Debate**
 - The broader devolution debate in Sri Lanka is also influenced by **Sinhalese nationalist sentiment**, which **opposes granting more autonomy to Tamil-majority regions**.
 - Many nationalist groups fear that **implementing 13A fully—especially provisions related to land and police powers—could lead to a gradual push for separatism**.
 - This **sentiment has historically shaped government policies**, leading to reluctance in implementing devolution measures despite repeated Indian diplomatic pressure.
- **The Way Forward: Towards a Durable Solution**
 - For Sri Lanka to achieve long-term stability and reconciliation, **the ruling coalition must recognize that the Provincial Councils** are not merely an Indian creation but a product of Sri Lanka's own political evolution.
 - The country's constitutional framework has historically drawn from global models, **including British, American, and French systems**.
 - Therefore, **dismissing 13A as an external imposition overlooks its potential to provide a democratic solution** to the ethnic conflict.
 - With a two-thirds majority in Parliament and a popular President, **the NPP has a unique opportunity to enact meaningful reforms**.
 - **A balanced approach that respects the aspirations of the Tamil population** while maintaining national unity is essential.
 - **Implementing the full provisions of 13A, including holding provincial council elections, would be a significant step** in addressing Tamil grievances and reinforcing Sri Lanka's democratic credentials.
- **Conclusion**
 - **India's decision to rename the Jaffna Cultural Centre after Thiruvalluvar symbolises its commitment to cultural diplomacy** and its historical ties with Sri Lanka, however, the deeper issue of Tamil political rights remains unresolved.
 - **The 13th Amendment, despite its flaws**, remains the most **viable framework for addressing Tamil aspirations** within a united Sri Lanka.
 - While India's stance on the issue may be evolving, **Sri Lanka's leadership must recognise that meaningful devolution is not merely a diplomatic obligation but a necessity** for national harmony.

5. The Science is Clear, Crowd Disasters Are Preventable GS 3 (Disaster Management)

• Why in News:

- The recent disaster at the Maha Kumbh in India, which claimed 30 lives, is another reminder of the dangers posed by high-density crowds.
- Despite scientific research offering clear solutions, local governments and event organisers often fail to take the necessary precautions.
- Therefore, it is important to explore the causes of crowd crushes, examines their global impact, stricter regulations and better crowd management strategies to prevent future tragedies.

• The Science Behind Crowd Crushes and Similar Past Incidents

○ The Science Behind Crowd Crushes

- Crowd crushes occur when too many people are compressed into a confined space, increasing the density beyond safe limits.
- Research shows that injuries begin occurring at a density of five people per square meter, while a density of seven people per square meter or more can lead to severe injuries or fatalities.
- This is because, at such high densities, individuals lose the ability to control their movements, and breathing itself can become difficult.
- The recent Maha Kumbh disaster is a textbook example of how crowd density can spiral out of control.
- Reports suggest that a large crowd formed behind a barrier, leading to intense pressure on those at the front.
- When movement is restricted, even minor disturbances, such as pushing or sudden shifts in direction, can trigger a deadly crush.

○ Similar Incidents

- Similar incidents have occurred worldwide, including the 2021 Astroworld concert in Houston, the 2022 Itaewon Halloween tragedy in South Korea, the 2023 Yemen charity distribution stampede, and the 2024 religious festival disaster in Nigeria.
- These examples highlight the widespread nature of the problem and emphasize the need for proactive crowd management strategies.

• Misconceptions Surrounding Crowd Crush Incidents and Economic Incentives Behind the Inaction

○ The Myth of Crowd Behaviour as the Cause

- Historically, people have believed that crowd crushes are caused by panic, with individuals recklessly pushing and trampling others in an attempt to escape.
- However, scientific studies on crowd dynamics have consistently debunked this notion.
- In reality, crowd crushes occur due to extreme density, not panic or aggression.
- When too many people are forced into a small space, physical movement becomes restricted, and individuals lose their ability to control their own actions.
- At this point, even minor pressure from behind—whether intentional or not—can cause people at the front to be squeezed against barriers, walls, or other individuals, leading to asphyxiation and fatal injuries.
- Furthermore, once a crowd reaches a critical density, people inside the mass are unable to see or understand what is happening around them.
- Even if they sense danger, they may have no way to escape or influence the movement of the crowd.
- This is why crowd crushes often occur even in calm settings, such as religious pilgrimages, where there is no aggressive or reckless behaviour.

The science is clear; crowd disasters are preventable



Tracy Heston
Professor at the
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This week, in India, 30 people were killed in a deadly crowd crush that occurred at the Maha Kumbh. The victims' bodies were pushed out to their families and friends. Tragedies such as this can have lasting for years on those who witness them at religious pilgrimages, sporting events, and even music concerts. As someone who studies crowd crushes, what makes them even more terrible is that they are almost entirely preventable.

Crowd crushes are dangerous, deadly, and sometimes scary. They are also scientifically well understood, easy to predict, and inexpensive to prevent. Yet, they continue to occur with alarming frequency in highly modern societies. What is worse than the people of India is missing the obvious and obvious line of life, it is to hope that governments and event organizers everywhere use this tragedy as an opportunity to commit to making the changes necessary to keep crowds safe.

Linked to crowd density

Crowd crushes occur when the density of a crowd becomes too high. Scientific studies have repeatedly shown that, at crowd densities of five people per square meter, there is a risk of crowd injuries, and that at seven people per square meter, the likelihood of death or serious injury is high. Crowd density is strongly influenced by the physical space around the crowd. If, for example, a crowd must squeeze or gather in a space that is too small, crowd density can increase to dangerous levels rapidly and become deadly. Preliminary reporting from the Maha Kumbh suggests that this is precisely what happened there: a large crowd developed behind a barrier, compressing its members into a dangerous density with tragic consequences.

Similar disasters have occurred all throughout the world in recent years. In November 2021, 10 people were killed in a crowd disaster at a live music concert in Houston, Texas, U.S. In October 2022, a crowd crush in Itaewon, South Korea, killed 159 people at a Halloween festival. In April 2023, nearly 40 people were killed in Sana'a, Yemen, at a charity distribution event. And, in December 2024, 32 people were killed at a religious festival in Nigeria.

These examples are just a small sampling of a type of catastrophe that happens more often than you may think.

For planners and governments to note

So, why do these tragedies and deaths keep happening after so many high-profile disasters? It's not because many of the news outlets and commentators that often report on such tragedies, these tragedies are the fault of crowds that are "out of control." We are too quick to blame the victims in these situations, and we forget to use common-sense wisdom, stereotypes, and rules of thumb to calculate for actual evidence.

In the science world, it's clear: preventing crowd crushes requires keeping crowd densities at safe levels, and the only entities who can do so effectively are the local governments, event organizers, and planners who plan and oversee these large events. Individual members of crowds themselves have a very limited ability to prevent what is happening to the crowd as a whole, and they are often the last to know.

It is not enough to control crowd density; it is to control crowd density, movement, and safety in the crowd can be meaningfully influenced by what is happening around them. In fact, at that point, the crowd members themselves may not even be able to take a full breath.

Crowd crushes are scientifically well understood, easy to predict, and inexpensive to prevent. Local planners and local governments can take

relatively easy steps to nearly eliminate the risk of crowd crush. They can open more exits and exits. They can change exit locations for large events. They can make sure passageways are clear of obstacles that might compress the crowd into bottlenecks. They can also suggest the crowd to go in groups to prevent a sudden crowd surge. Planners do this each year in New York's Times Square in New York City, placing the crowd into approved areas of roughly 200 people each to prevent the massive crowd from changing so much that it might create a dangerous crowd density. It is simple, it is relatively inexpensive, and it works.

The organizers and the economic factor

The problem is that, currently, in most nations, nothing requires governments, planners, or local governments to do any of this. Worse, event organizers themselves have a vested interest in keeping each line of the bottle. Instead, they have a strong economic incentive to pack as many people as possible into events to maximize ticket, food, and merchandise sales.

The tragedy at the Maha Kumbh, however, should inspire governments everywhere to reconsider their hands-off approach to crowd

crushes and pass sensible laws and regulations requiring event organizers, planners, and venues to take the basic steps needed to reduce the risk to individuals at large events. Even small measures of planning and training, designed to prevent and allow climate the risk that crowd members will be injured, trampled, or exposed to death can their lives while still allowing everyone to have a good time. The cost of waiting to make such changes will continue to be measured in human lives.

- **The Economic Incentives Behind Inaction**
 - Despite the clear benefits of proper crowd management, **many event organisers fail to implement these strategies.**
 - A major reason for this is **financial incentive.**
 - **Large-scale events**, whether concerts, religious gatherings, or sports matches, **generate significant revenue** through ticket sales, concessions, and merchandise.
 - **Organisers often have a vested interest** in packing as many people as possible into a venue to maximize profits.
 - **Implementing safety measures**, such as limiting attendance, expanding venue space, or hiring trained crowd managers, **is often seen as an unnecessary expense.**
 - **Governments also share some of the blame.** In many countries, there are no strict regulations **requiring event organisers to follow best practices for crowd safety.**
 - As a result, **safety measures are often left to the discretion of private promoters**, who may prioritise cost-cutting over public safety.
 - Without legal mandates and strict enforcement, **profit-driven decision-making can put thousands of lives at risk.**
- **Key Actions to Prevent Dangerous Crowd Densities**
 - **Venue Design and Capacity Management**
 - Ensuring that **event spaces are designed to accommodate the expected number of attendees** without creating choke points, bottlenecks, or dead ends.
 - Calculating crowd capacity based on scientifically proven density limits is essential.
 - **Sufficient Entry and Exit Points**
 - Having enough **well-spaced entry and exit routes prevents dangerous congestion.**
 - Restricted or blocked exits have been a major factor in past crowd disasters, trapping people in deadly situations.
 - **Staggered Arrivals and Departures**
 - Large crowds do not necessarily have to move all at once.
 - **Organisers can schedule staggered entry and exit times**, reducing the likelihood of mass surges at any given moment.
 - **Real-Time Crowd Monitoring**
 - Using surveillance cameras, drones, and other monitoring technologies can help organisers track crowd density and respond to potential dangers before they escalate.
 - **Crowd Segmentation Strategies**
 - Dividing large crowds into smaller, controlled sections can significantly reduce the risk of dangerous surges.
 - **New York City's Times Square New Year's Eve celebration is a prime example**, where barriers segment the crowd into smaller groups, making it easier to manage.
- **The Way Forward: Shifting Responsibility to Where It Belongs**
 - Instead of blaming individuals for 'chaotic behaviour' in crowd crush incidents, **governments and the public must hold event organisers accountable.**
 - **Authorities must enforce strict safety regulations**, requiring all large events to implement proven crowd management techniques.
 - **Penalties for negligence should be severe enough to deter reckless planning**, and event permits should be contingent on organizers demonstrating clear safety protocols.
- **Conclusion**
 - **The loss of life at the Maha Kumbh**, like so many other crowds crush incidents, **was not an accident but a preventable failure of planning and regulation.**
 - **Scientific research has made it clear how and why these disasters occur**, yet event organisers and governments continue to ignore basic safety measures.
 - **Until authorities take proactive steps** to enforce proper crowd management, **these tragedies will continue to claim innocent lives.**
 - **Only through strict regulations, better planning**, and a commitment to sa

6. Point Nemo

Recent events of importance

- **Why in News:** Two young women officers of the Indian Navy onboard the sailing vessel INSV Tarini recently crossed Point Nemo in the southern Pacific as a part of their efforts to circumnavigate the globe under Navika Sagar Parikrama-II.
- **About Point Nemo:**
 - Point Nemo, also known as the **Oceanic Pole of Inaccessibility**, holds the distinction of being the **farthest point from any landmass on Earth**.
 - This remote point lies in the **South Pacific Ocean** and is named after Captain Nemo, the sailor from Jules Verne's famous novel *Twenty Thousand Leagues Under the Sea*.
 - Situated approximately **2,688 km from the nearest landmass**, this isolated point is famous for its extreme remoteness, with **the closest human presence often being aboard the International Space Station** orbiting above.
 - The **nearest land** in each direction is:
 - To the north lies **Ducie Island**, part of the **Pitcairn Islands (British Overseas Territory)**.
 - To the northeast is **Motu Nui**, one of the **Easter Islands** (Chilean dependency).
 - To the south is **Maher Island**, part of **Antarctica**.
 - Due to its isolation, the waters around Point Nemo have **very little marine life**, and the region **falls within the South Pacific Gyre**, known for having some of the clearest and least biologically active ocean waters.
 - Due to its remoteness and relative lack of marine traffic, Point Nemo has become a popular location for space agencies to dispose of space junk.

INSV Tarini
crosses most
remote part
of earth

The Hindu Bureau
NEW DELHI

As part of the ongoing mission to circumnavigate the globe under the Navika Sagar Parikrama-II, Indian Navy officers Lieutenant Commander Dilna K. and Lieutenant Commander Roopa A., aboard sailing vessel *INSV Tarini*, passed through Point Nemo on Thursday during the leg of sailing from Lyttelton Port, New Zealand, to Port Stanley, Falkland Islands.

Point Nemo, located in the South Pacific, is known as the Oceanic Pole of Inaccessibility – the most remote location on earth, situated 2,688 kilometres from the nearest landmass.

"The officers have also collected vital water samples from the point, which will be analysed by the National Institute of Oceanography. These samples will provide valuable insights into oceanic conditions, including the presence of marine biodiversity and chemical composition contributing to global oceanographic research," a Navy official said.