

Consistency of performance
can be the most powerful
differentiator of all.

Joe Calloway

Important Issues of the Day

- **Rajasthan scraps two-child norm – Page No. 1, GS 2**
- **Eurasian diving duck – Page No. 5, GS 3**
- **Balancing faith – Page No. 8, GS 2**
- **Water in India – Page No. 8, GS 1,2**
- **World Bank Report – Value Addition**
- **Congo Lakes – Prelims**
- **Exercise DHARMA GUARDIAN – Prelims**

Rajasthan scraps two-child norm for local body, panchayat polls after three decades

Mohammed Iqbal

JAIPUR

Ahead of civic polls in Rajasthan, the State Cabinet on Wednesday approved the removal of three-decade-old legal provisions prohibiting persons with more than two children from contesting panchayat and urban local body polls.

The restriction was introduced in 1995 during the government led by former Chief Minister Bhairon Singh Shekhawat.

Parliamentary Affairs Minister Jogaram Patel said after the Cabinet meeting that it approved bringing Bills for amending Section

Two Bills will be introduced in the Assembly's ongoing Budget Session to amend the rule, the State Parliamentary Affairs Minister said

19 of the Rajasthan Panchayati Raj Act, 1994, and Section 24 of the Rajasthan Municipalities Act, 2009.

Mr. Patel said the legal provisions had become "outdated" following considerable change in the sociopolitical sphere over the years. He said the two Bills will be introduced and passed in the Assembly's

ongoing Budget Session.

"The two-child norm was introduced as a population control measure. It has lost its relevance now as the fertility rate has declined to 2, against 3.6 during 1991-94," he said.

Criticising the decision, State Congress president Govind Singh Dotasra said, "The BJP government should clarify whether it supports population control or follows the RSS (Rashtriya Swayamsevak Sangh) diktat."

RSS chief Mohan Bhagwat had recently suggested that Hindu families should consider having at least three children.

Several social organisations and public representatives had sought removal of the two-child norm in the past, contending that it was "discriminatory and inconsistent with democratic principles".

The State Cabinet also approved the formation of a Directorate of Revenue Intelligence and Economic Offences, establishment of an ayurvedic, yoga and naturopathy university in Ajmer, and adoption of an industrial park promotion policy. It cleared a revised financial model for the proposed Rajasthan Mandapam and Global Capability Centre project in Jaipur.

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- **The 73rd Constitutional Amendment Act, 1992, inserted Part IX (Articles 243–243O) and the Eleventh Schedule into the Constitution, granting constitutional recognition to Panchayati Raj Institutions (PRIs).**
- **It fulfilled Article 40 of the Directive Principles, mandating the organization of village panchayats with adequate powers and responsibilities.**
- **Institutional Framework: The Act established a three-tier structure:**
 - **Gram Panchayat at the village level,**
 - **Panchayat Samiti at the intermediate level, and**
 - **Zila Parishad at the district level.**
- **Regular Elections and Fixed Tenure: The Act mandates regular elections every five years for all levels of PRIs.**
- **In case of early dissolution, elections must be held within six months, ensuring continuity of democratic functioning.**
- **The Act established an independent State Election Commission (SEC) in each state to supervise, direct, and control PRI elections, ensuring autonomous and impartial electoral processes.**

- **Reservation for Social Justice and Inclusion:** To promote inclusivity, the Act reserves:
 - Seats for Scheduled Castes and Scheduled Tribes in proportion to their population.
 - One-third of all seats (including chairperson positions) for women.
- **Financial Empowerment:** Each state must constitute a State Finance Commission (SFC) every five years to recommend principles for:
 - Distribution of state revenues between the state and Panchayats,
 - Grants-in-aid, and
 - Measures to strengthen PRI finances.
- **Devolution of Powers and Responsibilities:** State legislatures are empowered to endow PRIs with functional authority over 29 subjects listed in the Eleventh Schedule—covering agriculture, health, education, and social welfare—promoting decentralized planning and local development.

- **As per Article 243F, the minimum age for contesting Panchayat elections in India is 21 years.**

Fresh elections to constitute a Panchayat shall be completed:

- **before the expiry of its duration of five years,**
- **in case of dissolution, before the expiry of a period of six months from the date of its dissolution.**
- **It is to be noted that, where the remainder of the period (for which the dissolved Panchayat would have continued) is less than six months, it shall not be necessary to hold any election for constituting the new Panchayat for such a period.**
- **Moreover, a Panchayat constituted upon the dissolution of a Panchayat before the expiration of its duration shall continue only for the remainder of the period for which the dissolved Panchayat would have continued had it not been so dissolved.**

Consider the following statements:

- 1. The minimum age prescribed for any person to be a member of Panchayat is 25 years.**
- 2. A Panchayat reconstituted after premature dissolution continues only for the remainder period.**

Which of the statements given above is/are correct?

- (a) 1 only**
- (b) 2 only**
- (c) Both 1 and 2**
- (d) Neither 1 nor 2**

Mains Question

Discuss the role of Panchayati Raj Institutions in achieving inclusive rural development. How far have financial devolution and functional autonomy been realised in practice?
(250 words)

समावेशी ग्रामीण विकास की प्राप्ति में पंचायती राज संस्थाओं की भूमिका का विश्लेषण कीजिए।

व्यवहार में वित्तीय एवं कार्यात्मक स्वायत्तता किस सीमा तक सुनिश्चित हो सकी है?
(250 शब्द)

Eurasian diving duck's presence in Kaziranga National Park triggers climate change concern

Rahul Karmakar
GUWAHATI

The seventh waterbird count at the Kaziranga National Park and Tiger Reserve in Assam released on Wednesday has spotlighted a new avian guest – a diving duck from the Eurasian taiga breeding grounds. However, the cheer for ornithologists and wildlife officials has come with some concern related to climate change.

“The smew (*Mergellus albellus*) signals wetland health in India, but its vagrant status flags climate-driven range shifts and the need to protect refuelling stops amid hunting and oil pollution threats,” said ornithologist Nilutpal Mahanta, a part of the waterbird census held from January 4 to 11.

A striking diving duck, the smew is a rare visitor to India. Sightings are sporadic and localised, mainly in northern or central Indian wetlands, including Haiderpur in Uttar Pradesh.

During the census, the smew was recorded at Rowmari-Donduwa beels



Smew, a Eurasian diving duck, spotted in Kaziranga National Park during the waterbird census in January 2026. SPECIAL ARRANGEMENT

in Laokhowa, part of the Kaziranga landscape covering 1,302 sq. km., and in the core areas of the park that are better known for its one-horned rhinoceroses.

The diving duck favours fish-rich, sheltered waters during winter, singly or in a small flock. Globally, there are an estimated 130,000 smews, but their number has been declining due to habitat loss and human activities.

Fewer waterbirds

The enumerators recorded 105,540 individual waterbirds belonging to 107 species. The number was 6,522 individuals and 17 species fewer than what

the sixth waterbird count yielded in 2025.

Officials downplayed the numerical dip. They said the arrival of the smew “underscores floodplain resilience for flyway migrants, guiding anti-encroachment efforts in the two Important Bird Areas (IBAs) in the Kaziranga landscape – the Kaziranga National Park and two wildlife sanctuaries, Laokhowa and Burhachapori, together.

“The first-ever sighting of the smew has stolen the spotlight in a record-breaking census of 105,540 birds. This spectacular debut reaffirms Assam’s wetlands and vital biodiversity hotspots,” Forest, Environ-

ment, and Climate Change Minister Chandra Mohan Patowary said.

This year’s survey, conducted by 120 enumerators and 50 volunteers, spanned 166 wetlands across 10 ranges of the tiger reserve. The recorded species included ducks or geese, waders, herons or egrets, and marsh birds. The top abundant species were the bar-headed goose, northern pintail, and lesser whistling duck. The census report highlighted targeted conservation needs with 18 critically endangered, endangered, vulnerable, and near-vulnerable species on the International Union for Conservation of Nature (IUCN) watchlists.

The top five wetlands by count were Laokhowa’s Rowmari Beel (15,661 birds), Donduwa Beel (14,469), Katakhal (4,979), Sohola (3,612), and Khalihamari (3,463). The top five wetlands by diversity were Rowmari (77 species), Donduwa (71), Sohola (69), Kawoimari-Bhoisamari-Diffulo (57), and Ververy (53).



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- **During the census, the smew was recorded at Rowmari-Donduwa beels in Laokhowa, part of the Kaziranga landscape covering 1,302 sq. km., and in the core areas of the park that are better known for its one-horned rhinoceroses.**
- **The diving duck favours fish-rich, sheltered waters during winter, singly or in a small flock. Globally, there are an estimated 130,000 smews, but their number has been declining due to habitat loss and human activities.**
- **The Smew (*Mergellus albellus*) is listed as Least Concern on the IUCN Red List.**
- **While its population trend is believed to be decreasing due to habitat loss and hunting, it has an extremely large range and a large population, not yet approaching thresholds for a threatened category. It is a migratory diving duck, often found in Eurasia and a rare visitor to India.**

Exercise DHARMA GUARDIAN



Exercise DHARMA GUARDIAN:

- **A bilateral annual military exercise between the Indian Army and the Japan Ground Self-Defense Force (JGSDF).**
- **The exercise focuses on joint operations in semi-urban environments and improving coordinated military responses.**
- **Nations involved: India and Japan**

Exercise VAJRA PRAHAR:

- **A joint Special Forces exercise between India and the United States aimed at enhancing cooperation in special operations.**
- **Designed to improve joint operational capability in mountainous terrain.**

Which of the following statements about 'Exercise Mitra Shakti-2023' are correct?

- 1. This was a joint military exercise between India and Bangladesh**
- 2. It commenced in Aundh (Pune).**
- 3. Joint response during counter-terrorism operations was a goal of this operation.**
- 4. Indian Air Force was a part of this exercise.**

Select the answer using the code given below:

(a) 1, 2 and 3

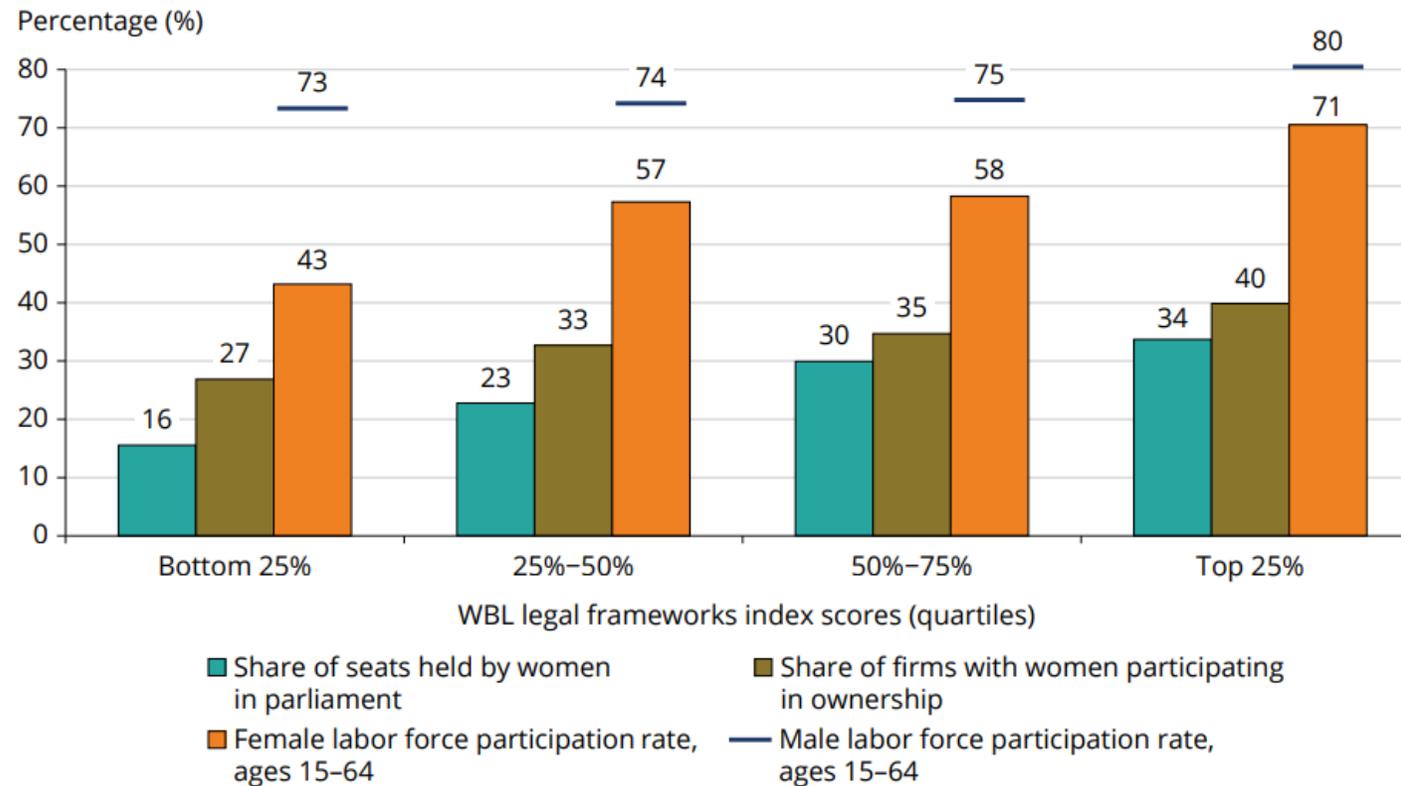
(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

World Bank Report

FIGURE ES.1 Equality laws are associated with more women working, owning businesses, and participating in politics, as well as a reduced gender gap in labor force participation



- **The World Bank's Women, Business and the Law 2026 report highlights a significant global implementation gap, where laws for women's economic equality exist on paper but often fail in practice due to weak enforcement and lack of supportive systems.**
- **The Women, Business and the Law (WBL) 2026 report is the 11th in a series of annual studies measuring the laws and policies affecting women's economic opportunities in 190 economies.**
- **This edition uses the WBL 2.0 framework, which benchmarks three pillars:**
 - **Legal Frameworks (the laws),**
 - **Supportive Frameworks (policies and services), and**
 - **Enforcement Perceptions (how laws are applied in reality).**

Key Highlights of the Report:

- **The Global Score:** The global average score for legal frameworks is 67.9 out of 100, but it drops sharply to 47.3 for supportive frameworks and 53.4 for enforcement perceptions.
- **Safety Gap:** Safety is the lowest-scoring area; while many countries have some laws, enforcement fails roughly 80% of the time, and only one-third of the necessary safety laws are in place globally.
- **The 4% Benchmark:** Only 4% of women live in economies that have achieved nearly full legal equality (scoring 90 or above) across all three pillars.
- **Economic Stakes:** Closing the gender gap in labor force participation could increase global GDP by more than 20% over the next decade.

- **Childcare Deficit:** Less than half of the 190 economies have laws providing financial support for families, and in low-income economies, only 1% of the required childcare support mechanisms exist.
- **Entrepreneurship Barriers:** Although women can legally start businesses in most places, only half of economies promote equal access to credit.
- **Reform Momentum:** Over the last two years, 68 economies enacted 113 positive legal reforms, with Sub-Saharan Africa leading with 33 reforms.
- **Implementation Crisis:** On average, economies have established fewer than half of the policies and services needed for effective enforcement of equality laws.

Mains Question

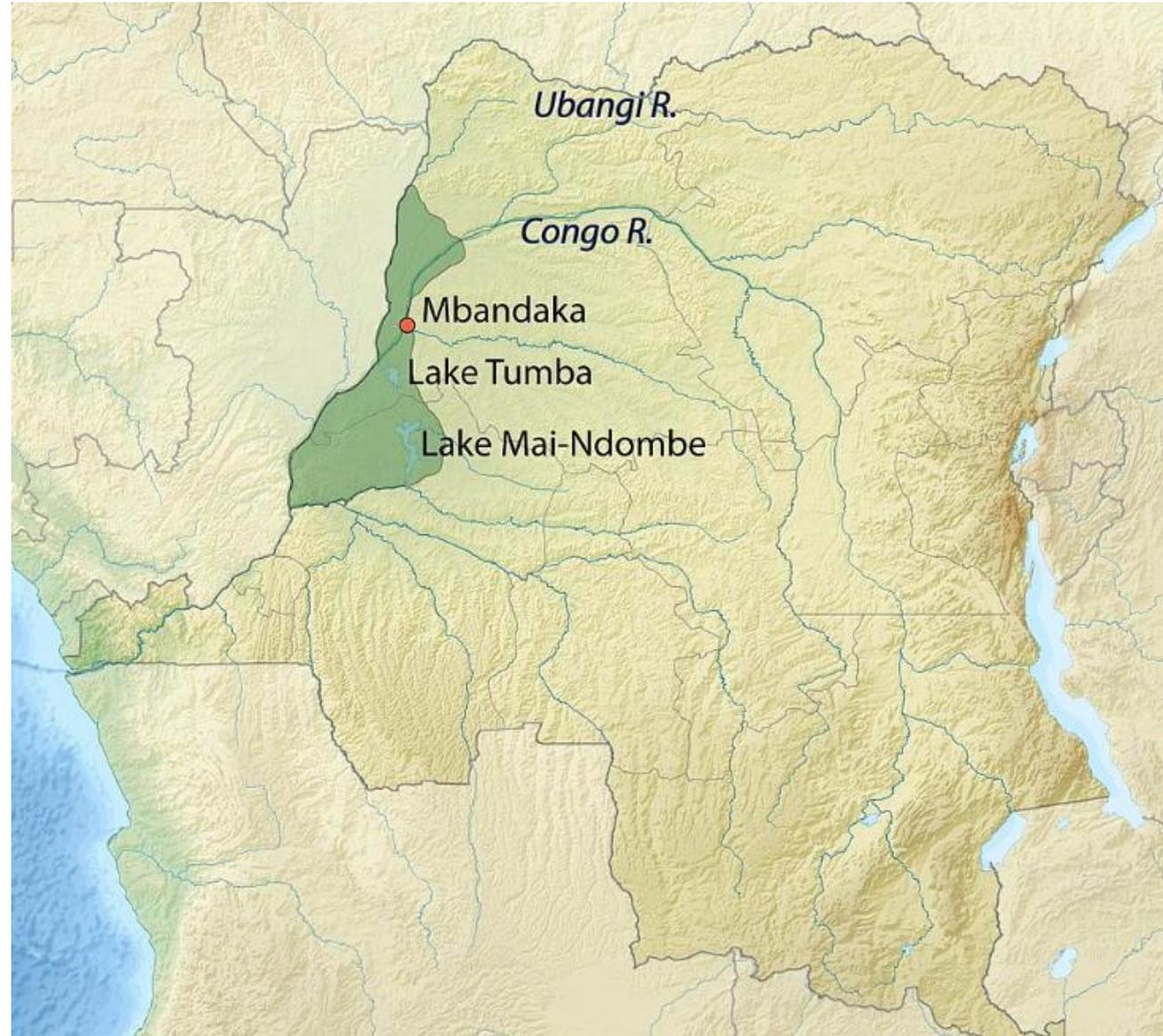
“Women empowerment is not merely a social objective but a prerequisite for inclusive and sustainable development.”

Discuss in the context of India’s socio-economic transformation. (250 words)

“महिला सशक्तिकरण केवल सामाजिक लक्ष्य नहीं, बल्कि समावेशी एवं सतत विकास की अनिवार्य शर्त है।”

भारत के सामाजिक-आर्थिक परिवर्तन के संदर्भ में चर्चा कीजिए। (250 शब्द)

Congo Lakes



- **A recent scientific study has found that lakes (Mai Ndombe and Tumba) in the Congo Basin are releasing ancient carbon stored for thousands of years in surrounding peatlands, raising fresh climate concerns.**
- **Lakes Mai Ndombe and Tumba are large, shallow blackwater lakes characterized by their dark, tea-like color. This unique appearance is caused by high concentrations of dissolved organic matter and humic acids leached from the surrounding dense swamp forests and peatlands.**
- **Country: Democratic Republic of Congo (DRC).**
- **Region: Situated within the Cuvette Centrale (Central Basin), a vast depression in the heart of the Congo Basin.**
- **Wetland Status: They form part of the Tumba-Ngiri-Maindombe area, the world's largest Wetland of International Importance recognized by the Ramsar Convention.**

Balancing faith, dignity and constitutional rights

When a five-judge Bench of the Supreme Court of India delivered its verdict, in September 2018, in *Indian Young Lawyers Association vs State of Kerala*, opening the doors of Kerala's Sabarimala temple to women of all ages, it provoked a range of reactions. There were protests across the country, especially in Kerala, where many believed that the Court had overlooked, and even disrespected, religious creed. Others saw the verdict as transformative, as outlining a vision that enlivened the Constitution. Now, close to a decade later, the Court will hear final arguments on review petitions that seek to overturn the earlier verdict and the law it laid down.

Opinion, dissent and turning point

The original ruling was delivered through a 4:1 majority. There was an opinion from then Chief Justice of India (CJ) Dipak Misra, to which Justice A.M. Khanwilkar joined. There were separate, concurring opinions from Justices Rohinton Nariman and D.Y. Chandrachud and a notable dissent from Justice Indu Malhotra. But despite the cleavage in the rationales adopted, the majority's findings were clear.

First, the Court ruled that the devotees of Lord Ayyappa did not constitute a separate religious denomination; second, that the bar enforced on women between the ages of 10 and 50 from entering the temple violated the rights of women to freedom of religion; and third, that Rule 3(b) of the Kerala Hindu Places of Public Worship (Authorisation of Entry) Rules, 1965, on which the ban was grounded, violated not only the Constitution but also Section 3 of its parent law, which promised free access to temples for all classes of Hindus.

In her dissenting opinion, Justice Malhotra found, among other things, that fundamental rights in a secular polity needed harmonising, that a generic doctrine of equality cannot override the collective rights of individuals to practise their faith in line with their customs and ideals. She also found that, as a matter of custom, women of a certain age had been excluded from the temple's precincts, and this constituted a non-derogable "essential religious practice".

The latter finding represented the central axis on which the case turned. The Constitution recognises both the freedom of religion as an individual right and the rights of religious denominations to manage their own affairs in matters of religion. Both rights are subject to public order, morality and health, and in the case of an individual's right to freedom of religion also to other fundamental rights.

Balancing communitarian interests with individual conscience has long plagued our jurisprudence. Over the years, when it has been



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The Sabarimala review's final arguments will also centre on the broader architecture of India's religious freedom jurisprudence

called to resolve tensions of this kind, the Court has used a test that has allowed it to virtually sit in theological judgment over religious practice. That is, it examines and arrives at a factual conclusion on whether a practice in question is essential to the religion or not. This has meant that the Court has effectively determined not only those areas where it might be constitutionally justifiable for the state to intervene but has also determined what kinds of practices are deserving of constitutional protection in the first place.

For example, in *Sastri Yagnapurushadji vs Muldas Bhudardas Vaishya* (1966), CJI P.B. Gajendragadkar deduced what was essential to the followers of the Swaminarayan sect through selective references to Hindu texts without so much as asking what the conscience of the followers, in fact, dictated. In one passage, he even concluded that the "genesis of the suit...is founded on superstition, ignorance and complete misunderstanding of the true teachings of Hindu religion".

A court sitting as a moral arbiter on religion ought to be anathema to secularism. Therefore, that we need a theory that departs from the essential religious practices test ought to be beyond doubt. As Justice Chandrachud wrote, in his judgment in *Indian Young Lawyers Association*, "The rationale for allowing a religious community to define what constitutes an essential aspect of its religion is to protect the autonomy of religions and religious denominations. Protecting that autonomy enhances the liberal values of the Constitution... By entering upon doctrinal issues of what does or does not constitute an essential part of religion, the Court has, as a necessary consequence, been required to adopt a religious mantle."

The test also suffers from other practical limitations. It calls upon a constitutional court to arrive at fully fleshed out factual findings without allowing parties to lead oral evidence or subject witnesses to cross examination. What is more, the doctrine also does not offer a clear solution for what is really an obvious problem: what must a court do when a practice it finds essential to religion also undermines, or is inimical to, the dignity of individuals?

On an 'anti-exclusion test'

It is for this reason that Justice Chandrachud proposed an "anti-exclusion test". In his formulation, this norm would allow for due deference to be shown to each religious group to determine for themselves what doctrines and tenets to follow. At the same time, should any such practice exclude an individual in a manner which impairs their dignity or hampers their access to basic goods, "the freedom of religion must give way to the over-arching values of a liberal constitution".

At a doctrinal level, the test is not beyond complications. At first glance, it might well seem to replicate some of the difficulties that have long beleaguered the essential religious practices doctrine. To determine whether a particular form of exclusion impairs dignity or access to basic goods, a court must inevitably engage with the meaning and purpose of the practice in question. Such an inquiry cannot be carried out in the vacuum. It may have an impact on the normative content of faith itself. But where it differs is that the investigation remains grounded in constitutional terms rather than theological ones.

A crucial distinction

In other words, the anti-exclusion test does not ask whether a practice is essential to religion; it asks whether the consequences of a practice are compatible with the Constitution's guarantees of equal treatment and protection. This distinction is crucial. Under the essential religious practices test, constitutional protection turns on whether a court sees a practice as critical to the exercise of faith.

By contrast, under the anti-exclusion test a court accepts, as a starting point, the autonomy of religious groups to define their own tenets. It only intervenes to ensure that the exercise of that liberty does not lead to a systematic exclusion of individuals from places or benefits that are integral to their ability to lead a life of dignity.

When the nine-judge Bench begins its hearings, it will have the opportunity to reflect on the broader architecture of India's religious freedom clauses. The principles it lays down will have a bearing not only on the Sabarimala dispute but also on a host of other controversies as well – including the rights of Dawoodi Bohra community members against excommunication and of Parsi women to continue to practise the Zoroastrian faith upon marrying outside the religion.

As the framers of the Constitution recognised, religion and social life are inextricably connected in India. This makes it impossible for courts to remain entirely indifferent to the real-life consequences of religious practice. The anti-exclusion test acknowledges that faith must remain autonomous in its own domain, but its outward exercise must comport with the Constitution's commitment to equal moral membership.

If the individual is to remain the basic unit of constitutional concern, communitarian claims cannot override a person's right to access spaces and institutions that shape civic life. In placing dignity at the heart of the inquiry, the anti-exclusion test offers a framework that remains truest to the Constitution's transformative promise, by protecting belief without licensing discrimination in its name.

- **When a five-judge Bench of the Supreme Court of India delivered its verdict, in September 2018, in Indian Young Lawyers Association vs State of Kerala, opening the doors of Kerala's Sabarimala temple to women of all ages, it provoked a range of reactions.**
- **There were protests across the country, especially in Kerala, where many believed that the Court had overlooked, and even disrespected, religious creed. Others saw the verdict as transformative, as outlining a vision that enlivened the Constitution.**
- **The original ruling was delivered through a 4:1 majority. There was an opinion from then Chief Justice of India (CJI) Dipak Misra, to which Justice A.M. Khanwilkar joined. There were separate, concurring opinions from Justices Rohinton Nariman and D.Y. Chandrachud and a notable dissent from Justice Indu Malhotra.**

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- **In her dissenting opinion, Justice Malhotra found, among other things, that fundamental rights in a secular polity needed harmonising, that a generic doctrine of equality cannot override the collective rights of individuals to practise their faith in line with their customs and ideals.**
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- **In placing dignity at the heart of the inquiry, the anti-exclusion test offers a framework that remains truest to the Constitution’s transformative promise, by protecting belief without licensing discrimination in its name.**

- **The Sree Dharma Sastha Temple at Sabarimala, considered one of the prominent pilgrimage sites for people of all religions in India.**
- **The shrine of Lord Ayyappa is located atop a hill, 3000 metres above the sea level, at Sabarimala in Pathanamthitta district of Kerala.**
- **One has to trek upwards from Pamba, the base of the hill, to reach the temple.**
- **The temple is located inside the Periyar Tiger Reserve under Ranni forest division.**
- **The idol of the deity is made of 'panchaloha', alloy from five metals.**

Unpackaging the myth of safe bottled water in India

Page No. 8, GS 1,2

In contemporary India, bottled water has quietly shifted from an occasional convenience to an everyday necessity. Across railway stations, offices and restaurants, packaged drinking water is now routine, driven by declining trust in municipal supplies and the belief that water sealed in plastic is safer.

In recent years, however, scientific studies, including research conducted in India, have begun to challenge this perception. While bottled water is regulated and generally found to be microbiologically safe, concerns are no longer limited to bacteria and pathogens. Attention is now turning to less visible risks, including microplastic particles and trace chemicals that leach from plastic containers, and their potential long-term implications for human health and environmental sustainability.

Microplastics as top contaminant

Microplastics are plastic particles smaller than five millimetres. Bottled drinking water has become a direct and significant route of human exposure to these particles.

A study based in Nagpur, Maharashtra, detected microplastics in all sampled brands of bottled water, with concentrations ranging from 72 particles to 212 particles per litre. Locally bottled water showed higher contamination than national brands, pointing to possible gaps in bottling practices and quality control measures.

This pattern is not isolated. Studies examining bottled water from Mumbai and coastal Andhra Pradesh detected microplastics in every sample analysed, indicating that contamination occurs across regions and supply chains. Taken together, these findings indicate that microplastics in bottled drinking water is an emerging contaminant in India, not just confined to western markets.

The health effects of ingesting microplastics are still under investigation. However, these particles are known to carry toxic additives and pollutants. Emerging research suggests that smaller particles may cross biological barriers, raising concerns about the safety of bottled drinking water. The issue is further compounded



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Policy and regulatory authorities need to acknowledge the public health and environmental risks

by nanoplastics, which are even smaller particles, fall below current detection thresholds, and remain outside existing safety regulations.

This reveals a regulatory gap: while exposure through everyday sources such as bottled water is increasingly documented, safety standards remain focused on visible or short-term contaminants, leaving potential long-term risks largely unmonitored.

Bottled water is also vulnerable to chemical leaching from plastic containers. Additives such as antimony, phthalates and other plasticisers can migrate into water, particularly when bottles are exposed to heat or stored for prolonged periods – conditions common in India's supply chains.

Leaching may occur during transportation, warehouse or retail display, especially when bottles are stored in direct sunlight. Studies show elevated temperatures and ultraviolet exposure accelerate this leaching process.

While detected chemicals remain within regulatory limits, existing standards typically assess isolated substances over short durations. They fail to adequately account for cumulative, long-term exposure to multiple additives, in combination with microplastics, thereby creating a critical disconnect between daily consumption patterns and regulations oversight.

Regulations lag behind

In India, packaged drinking water is regulated primarily by the Food Safety and Standards Authority of India (FSSAI), which oversees licensing, testing and compliance under updated norms following the removal of mandatory BIS certification. While this framework has improved baseline quality, its scope remains limited. These standards do not include testing for, or limit on, microplastics, nor do they adequately address long-term exposure to plastic-derived chemicals under real-world storage conditions.

State-level surveys, including those conducted in Karnataka, have frequently identified bottled water samples that are unsafe or substandard, highlighting gaps in enforcement rather than the absence of regulations. This challenge is compounded by a fragmented industry of

thousands of small bottling units, many operating with minimal oversight and drawing on already stressed groundwater reserves.

The public health risks of bottled water usage cannot be separated from its environmental footprint. India is already grappling with a plastic waste crisis, generating millions of tonnes annually, of which single-use water bottles form a large share. As plastic degrades in landfills, rivers and oceans, it fragments into microplastics that re-enter ecosystems and water sources, which ultimately contaminate water sources, including bottled water supplies themselves. This convergence of environmental degradation and human health risk underscores the inadequacy of treating bottled water merely as a consumer convenience.

Towards safer alternatives

Bottled water remains indispensable during emergencies, disaster relief and areas lacking reliable potable water infrastructure. The concern, therefore, is not prohibition but over-dependence and misplaced trust.

In the interim, exposure risks can be reduced through point-of-use filtration capable of removing particulate matter, avoiding prolonged storage of bottled water under heat, and expanding access to refill stations and public water dispensing systems.

At a systematic level, strengthening the municipal water supply system, ensuring transparent public disclosure of water quality, expanding access to affordable household filtration, and improving consumer awareness can help recalibrate public trust toward monitored and accountable public water systems.

Equally important is updating regulatory frameworks to include routine testing for microplastics and plastic-derived contaminants currently absent in FSSAI and BIS standards.

When harm is clearly documented and scientific evidence continues to accumulate, the issue is no longer whether the problem exists, but whether policy institutions and regulatory instruments are willing to acknowledge it, measure it honestly, and assign responsibility.

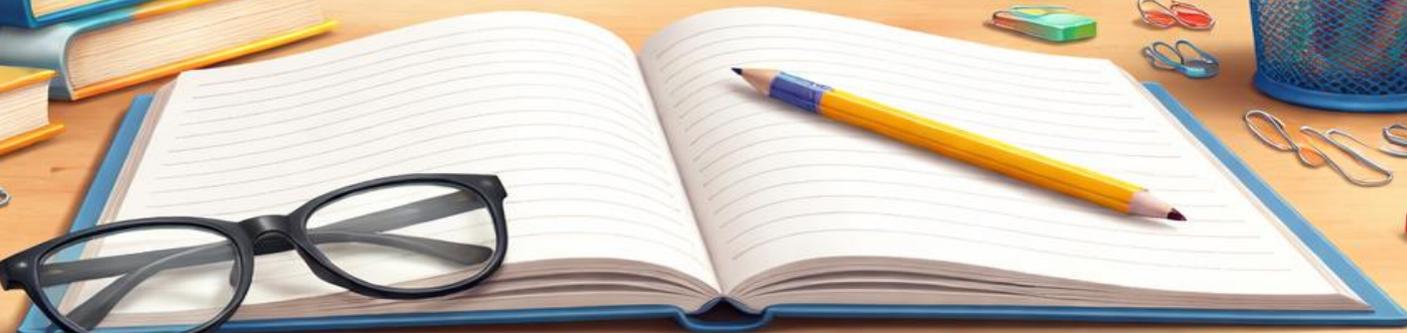
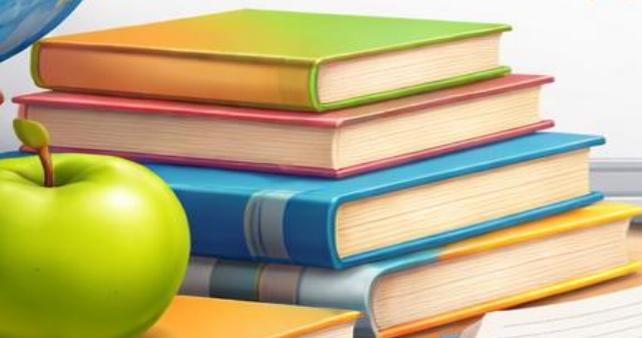
- **In contemporary India, bottled water has quietly shifted from an occasional convenience to an everyday necessity.**
- **Across railway stations, offices and restaurants, packaged drinking water is now routine, driven by declining trust in municipal supplies and the belief that water sealed in plastic is safer.**
- **In recent years, however, scientific studies, including research conducted in India, have begun to challenge this perception.**
- **While bottled water is regulated and generally found to be microbiologically safe, concerns are no longer limited to bacteria and pathogens.**
- **Attention is now turning to less visible risks, including microplastic particles and trace chemicals that leach from plastic containers, and their potential long-term implications for human health and environmental sustainability.**

- **Microplastics are plastic particles smaller than five millimetres. Bottled drinking water has become a direct and significant route of human exposure to these particles.**
- **A study based in Nagpur, Maharashtra, detected microplastics in all sampled brands of bottled water, with concentrations ranging from 72 particles to 212 particles per litre. Locally bottled water showed higher contamination than national brands, pointing to possible gaps in bottling practices and quality control measures.**
- **This pattern is not isolated. Studies examining bottled water from Mumbai and coastal Andhra Pradesh detected microplastics in every sample analysed, indicating that contamination occurs across regions and supply chains. Taken together, these findings indicate that microplastics in bottled drinking water is an emerging contaminant in India, not just confined to western markets.**

- **The health effects of ingesting microplastics are still under investigation. However, these particles are known to carry toxic additives and pollutants.**
- **Emerging research suggests that smaller particles may cross biological barriers, raising concerns about the safety of bottled drinking water.**
- **The issue is further compounded by nanoplastics, which are even smaller particles, fall below current detection thresholds, and remain outside existing safety regulations.**
- **This reveals a regulatory gap: while exposure through everyday sources such as bottled water is increasingly documented, safety standards remain focused on visible or short-term contaminants, leaving potential long-term risks largely unmonitored.**

- **Bottled water is also vulnerable to chemical leaching from plastic containers.**
- **Additives such as antimony, phthalates and other plasticisers can migrate into water, particularly when bottles are exposed to heat or stored for prolonged periods — conditions common in India's supply chains.**
- **Leaching may occur during transportation, warehouse or retail display, especially when bottles are stored in direct sunlight.**
- **Studies show elevated temperatures and ultraviolet exposure accelerate this leaching process.**

Thank You!



ABCs

