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DAILY CURRENT AFFAIRS-

1. Chemistry Nobel Prize 2026: Chiral Molecules
2. India's Cement Footprint and Net-Zero 2070
3. Illegal GM Hybrids in Cotton Cultivation
4. RBI MPC: Shift from Dovish to Hawkish Stance
5. Election Commission of India: Independence and Appointment of Election Commissioners

1.Chemistry Nobel Prize 2026: Chiral Molecules

Source: The Hindu

Context

French chemist Henri Kagan and Japanese chemist Kenso Soai were awarded the 2026 Nobel Prize in Chemistry for discoveries explaining how small molecular asymmetries can be amplified during chemical reactions.

What are Chiral Molecules?

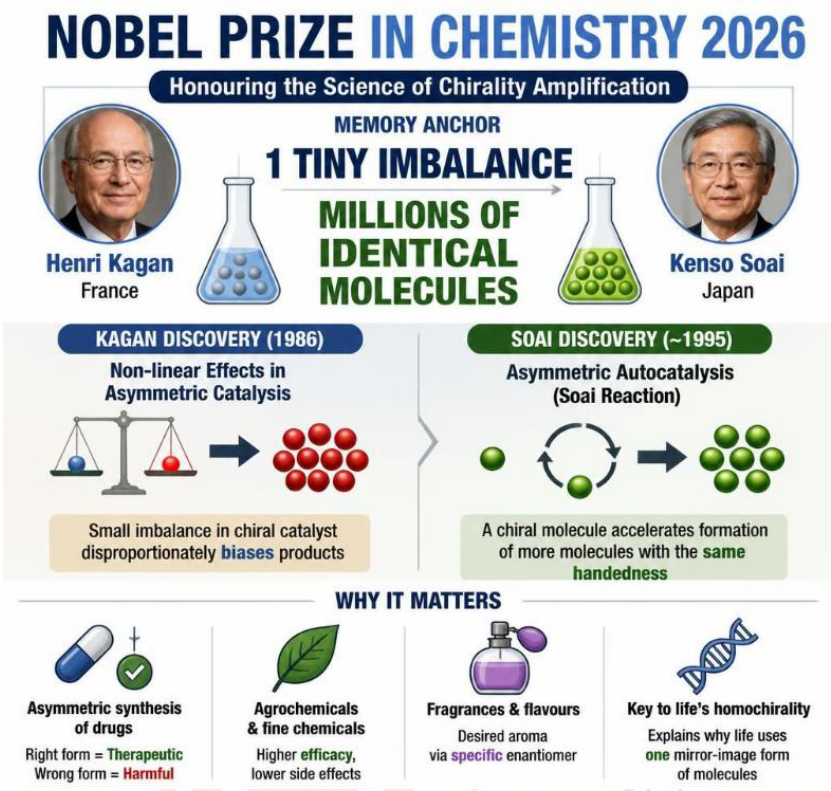
- Chiral molecules exist in two **non-superimposable mirror-image forms**, called enantiomers.
- They have the same molecular formula and bonding but differ in three-dimensional arrangement.
- Biological systems such as enzymes and receptors are themselves chiral and can therefore interact differently with each enantiomer.

Key Contributions

- **Henri Kagan (1986):** Demonstrated **non-linear effects in asymmetric catalysis**, showing that a small chiral imbalance in a catalyst can produce a much larger imbalance in the reaction products.
- **Kenso Soai:** Discovered **asymmetric autocatalysis (Soai reaction)**, in which a chiral product promotes the formation of more molecules with the same molecular handedness.
- Together, these findings helped explain how tiny initial asymmetries can become strongly amplified.

Significance

- Advanced **asymmetric organic synthesis**, enabling chemists to selectively produce the desired enantiomer.
- Important for developing **pharmaceuticals, agrochemicals and fragrances**.
- In medicines, different enantiomers can have very different biological effects; one may be therapeutically useful while another may be inactive or harmful.



- The work also contributes to understanding the origin of **homochirality**, the predominance of one molecular handedness in biological systems

2.India's Cement Footprint and Net-Zero 2070

Source: IE

Context

India's cement industry is a major challenge to achieving the country's **net-zero target by 2070**, as rising construction demand is expected to substantially increase cement production.

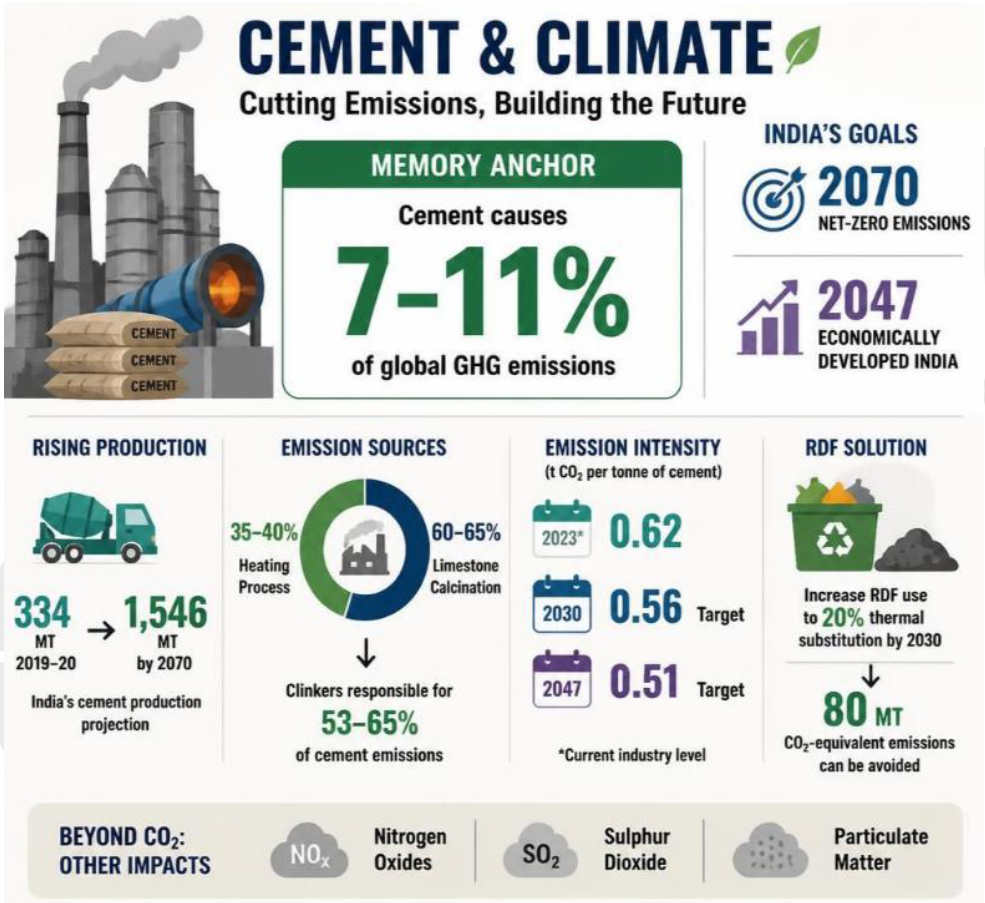
Why Cement is Carbon-Intensive?

- Cement production contributes around **7–11% of global GHG emissions**.
- **Calcination of limestone** releases CO_2 directly: limestone → clinker + CO_2.
- High-temperature heating accounts for about **35–40%** of cement emissions.
- Clinker production is responsible for a major share of cement-related emissions.

- Limestone mining can cause **deforestation, topsoil loss and reduced carbon sequestration**.
- Other pollutants include **NOx, SO_2 and particulate matter**.

India's Challenge

- Cement production: **334 MT (2019–20) → projected 1,546 MT by 2070**.
- Current emission intensity: about **0.62 tonnes CO_2/tonne cement**.
- Targets: **0.56 tCO_2/t cement by 2030** and **0.51 tCO_2/t by 2047**.
- Rapid urbanisation and infrastructure development could increase cement demand significantly.



Way Forward

- **Increase Refuse-Derived Fuel (RDF):** NITI Aayog recommends achieving **20% thermal substitution by 2030**, potentially reducing about 80 MT CO_2-equivalent emissions.
- **Reduce clinker content:** Use slag and fly ash to produce blended cement. According to IEA, replacing one tonne of clinker can avoid about **0.83 tonnes of CO_2**.

- Promote **Portland Pozzolana Cement (PPC)** and **Portland Slag Cement (PSC)** over high-clinker OPC where technically appropriate.
- Deploy **Carbon Capture, Utilisation and Storage (CCUS)** for residual process emissions.
- Encourage low-carbon construction using **compressed earth blocks, lime-based binders and traditional techniques** such as Kath-Kuni.

Conclusion

Decarbonising cement requires a combination of **material efficiency, alternative fuels, clinker substitution, cleaner technologies and carbon capture**, while ensuring that India's infrastructure needs are not compromised.

3.Illegal GM Hybrids in Cotton Cultivation

Source: IE

Context:

- A study commissioned by the Federation of Seed Industry of India (FSII) and National Seed Association of India (NSAI) found that up to 30% of India's cotton cultivation area may be under unapproved genetically modified (GM) hybrids.
- The study covered 16 districts across Maharashtra, Telangana, Andhra Pradesh and Rajasthan.



Key Findings

- Around 26.2–29 lakh hectares, or nearly 24–30% of India's cotton area, was reportedly found to be under unapproved GM hybrids.
- The identified traits include cp4-epsps, which provides glyphosate tolerance, and Vip3A, which provides enhanced insect resistance.
- India currently permits Bt cotton hybrids containing cry1Ac and cry2Ab genes for resistance against certain bollworm pests.
- The unauthorised HTBt cotton combines herbicide tolerance with Bt-based insect resistance.

Why Farmers Are Adopting Them?

- Farmers are reportedly adopting unapproved HTBt cotton because of labour shortages and the lower cost of glyphosate-based weed management compared with manual weeding.
- The unauthorised seed market reportedly increased from 35 lakh packets in 2017–18 to around 82–88 lakh packets in 2025–26.
- The estimated value of this unauthorised seed market is around ₹820–880 crore.
- The spread of these hybrids has coincided with declining sales of legal Bt cotton hybrid seeds and a reported 29% rise in glyphosate imports between 2024–25 and 2025–26.

Genetically Modified Crops (GM Crops)

Genetically Modified (GM) crops are plants whose DNA has been altered using genetic engineering to include desired traits like pest resistance, herbicide tolerance, or enhanced nutritional value. Unlike traditional breeding, which crosses related species, GM technology can insert genes from entirely different organisms (e.g., bacteria).

The Indian Landscape (Status 2025-26)

India maintains a cautious approach, balancing technological advancement with environmental and biosafety concerns.

- **Commercial Success: Bt Cotton** remains the **only** GM crop approved for commercial cultivation in India (since 2002). It incorporates a gene from the soil bacterium *Bacillus thuringiensis* to resist the American Bollworm.
- **The GM Mustard Saga (DMH-11):** Developed by Delhi University, this hybrid aims to increase yields and reduce India's massive edible oil import bill.
  - **Current Status:** As of late 2025, the matter remains under **Supreme Court** review following a split verdict in July 2024. The court has directed the Centre to formulate a **National Policy on GM crops** after consulting all stakeholders.
- **Bt Brinjal:** Though it received GEAC approval in 2009, it has been under an indefinite moratorium since 2010 due to public and political opposition.

Global Trends vs. India

Feature	Global Status (2025)	India Status (2025-26)
Leading Producers	USA, Brazil, Argentina, China.	Only Bt Cotton is commercialized.
New Frontiers	Drought-tolerant wheat, biofortified rice (Golden Rice), and climate-resilient maize.	Trials for GM Mustard, Maize, and Potato are in various stages of scru
Acreage	Reached a record **216 million hectares** globally in 2025.	Stable acreage, predominantly in t cotton belt.

4.RBI MPC: Shift from Dovish to Hawkish Stance

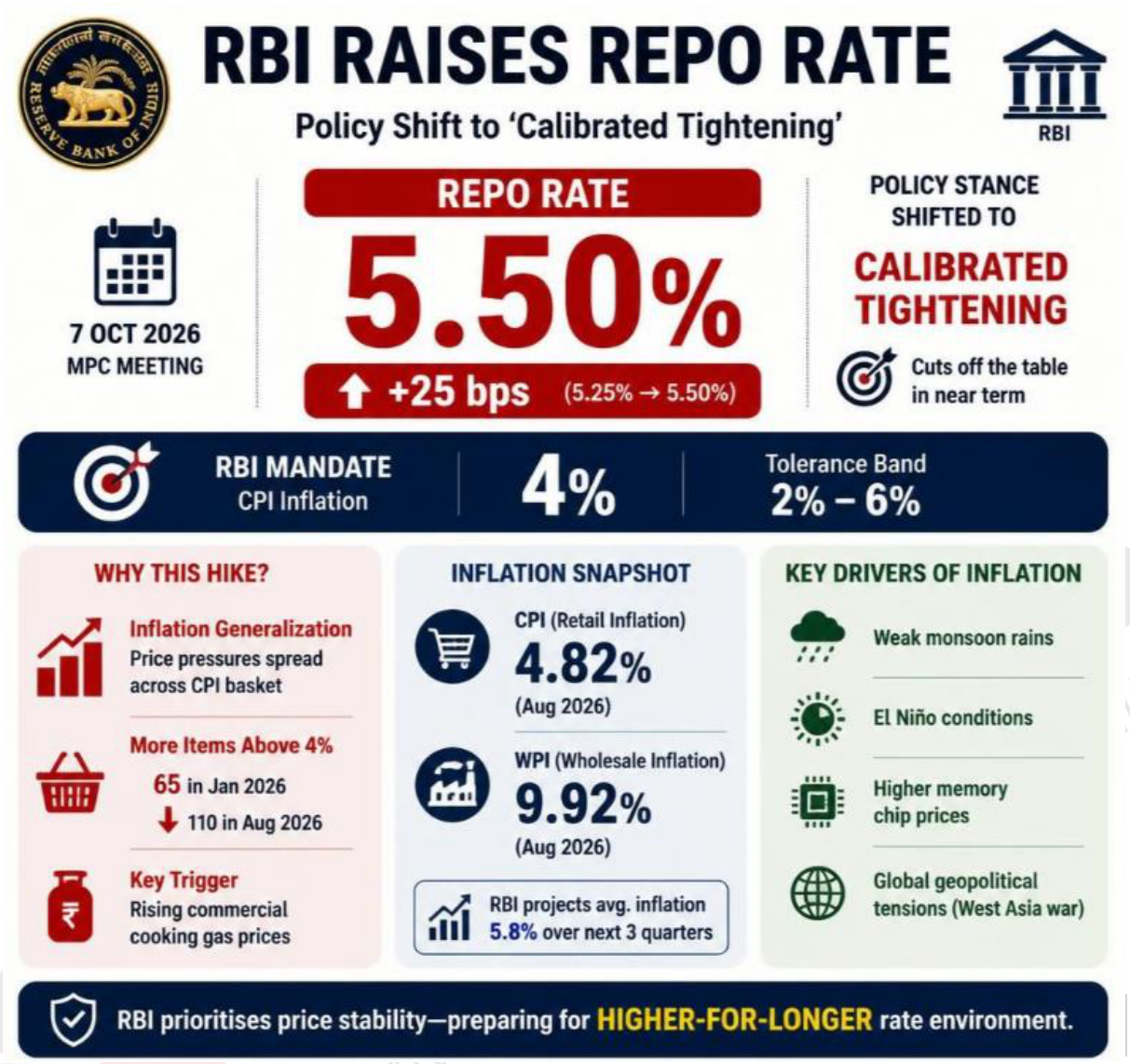
Source: IE

Context:

- The RBI Monetary Policy Committee (MPC) raised the policy repo rate by 25 basis points to 5.5% on October 7, 2026.
- The MPC shifted its stance from "neutral" to "calibrated tightening", signalling a more hawkish approach to contain inflation.

Why the Stance Changed?

- The RBI became concerned about the generalisation of price pressures across the Consumer Price Index (CPI) basket.
- The number of CPI items recording inflation above 4% increased from 65 in January to 110 in August.
- Retail CPI inflation rose to 4.82% in August, while WPI inflation reached 9.92%.
- RBI Governor Sanjay Malhotra highlighted projected average inflation of 5.8% over the next three quarters.
- Inflationary pressures were attributed to factors including weak monsoon rains, El Niño conditions, higher memory-chip prices and geopolitical developments such as the West Asia conflict.



Significance of Repo Rate Hike

- The RBI is mandated to maintain CPI inflation at 4% with a tolerance band of 2–6%.
- A higher repo rate increases the cost of funds for commercial banks and can subsequently raise lending rates for households and businesses.
- The shift to calibrated tightening indicates that interest-rate cuts are unlikely in the near term and points towards a higher-for-longer interest-rate environment.
- The policy change reflects the MPC's greater emphasis on containing broader and persistent inflationary pressures.

5.Election Commission of India: Independence and Appointment of Election Commissioners

Source: The Hindu,

Why in News?

The debate over the appointment of Election Commissioners has revived concerns that were already raised in the Constituent Assembly regarding executive influence over the electoral machinery. The issue is significant because the Election Commission of India (ECI) is responsible for conducting elections and ensuring the integrity of the electoral process.

Constitutional Framework of the ECI

- The ECI is a constitutional body established under **Article 324**, which vests it with the "superintendence, direction and control" of elections.
- It conducts elections to:
    - Parliament
    - State Legislatures
    - President
    - Vice-President
- The Commission currently consists of the **Chief Election Commissioner (CEC) and two Election Commissioners (ECs)**.
- The ECI was initially a single-member body; it became a permanent multi-member body in 1993.
- Its functions include:
    - Preparation and revision of electoral rolls.
    - Conduct and scheduling of elections.
    - Implementation of the Model Code of Conduct.
    - Advising the President/Governors on disqualification of legislators under Articles 103 and 192.
    - Recognition of political parties and allotment of election symbols.

Constituent Assembly's Concern

- The independence of the electoral machinery was debated extensively during constitution-making.

- **Shibban Lal Saxena** argued that appointments should require approval by a two-thirds majority of Parliament so that a single political party could not dominate the process. **H.N. Kunzru** warned that if electoral machinery lacked integrity, "democracy will be poisoned at the source."
- Dr. B.R. Ambedkar acknowledged the difficulty of designing an appointment mechanism and described it as one of the Drafting Committee's "greatest headaches."
- The American model of legislative confirmation was considered but Ambedkar expressed concern that it could introduce political considerations into appointments.
- Ultimately, Article 324 provided for appointment by the President, with Parliament empowered to regulate the process through law.

Judicial Intervention and 2023 Act

- For several decades, Parliament did not enact a law specifically prescribing the appointment procedure.
- In **Anoop Baranwal v. Union of India (2023)**, the Supreme Court addressed this legislative vacuum and prescribed an interim selection mechanism consisting of:
    - Prime Minister
    - Leader of Opposition in Lok Sabha
    - Chief Justice of India
- This mechanism was to operate until Parliament made a law governing appointments. SciGov
- Parliament subsequently enacted the **Chief Election Commissioner and Other Election Commissioners (Appointment, Conditions of Service and Term of Office) Act, 2023**.
- Under the Act:
    - A Search Committee headed by the Law Minister prepares a panel of candidates.
    - The Selection Committee consists of the Prime Minister, Leader of Opposition in Lok Sabha and a Union Cabinet Minister nominated by the Prime Minister.
- Thus, the CJI was replaced by a Union Cabinet Minister in the statutory selection mechanism.
- The change has generated debate over the appropriate balance between executive participation and institutional independence. The Supreme Court has recorded

challenges specifically concerning the replacement of the CJI and the transparency of the selection process

Independence of the ECI: Key Issues

- The core constitutional concern is that the body conducting elections should be institutionally capable of exercising its functions without undue influence from the government of the day.
- The debate involves two competing considerations:
    - **Executive accountability:** The elected government participates in appointments to a constitutional body.
    - **Institutional independence:** The selection process should inspire confidence among all political stakeholders and voters.
- The CEC enjoys stronger removal protection: removal is broadly on the same basis and manner as a Supreme Court judge, while the Election Commissioners have a different statutory/constitutional protection framework.
- The issue therefore goes beyond the identity of individual office-holders and concerns the design of institutions responsible for free and fair elections.

Way Forward

- A transparent, merit-based and clearly defined selection process can strengthen public confidence.
- Selection should ensure meaningful participation of both the government and opposition.
- Objective eligibility criteria, transparent shortlisting and adequate disclosure can reduce perceptions of partisan selection.
- Parliamentary scrutiny or a broader bipartisan consultation mechanism could be considered while preserving administrative efficiency.
- The larger constitutional principle should remain the **independence, neutrality and credibility of the electoral machinery**.

UPSC Prelims Practice

With reference to the Election Commission of India and the appointment of Election Commissioners, consider the following statements:

1. Article 324 establishes the Election Commission of India.
2. The Supreme Court's judgment in *Anoop Baranwal v. Union of India* prescribed a selection committee including the Prime Minister, Leader of Opposition and Chief Justice of India until Parliament enacted a law.
3. The 2023 Act retained the Chief Justice of India as a member of the statutory Selection Committee.

Which of the statements given above is/are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answer: (a)

Explanation: Article 324 provides the constitutional basis for the ECI. *Anoop Baranwal* prescribed the PM–LoP–CJI arrangement as an interim mechanism. The 2023 Act replaced the CJI with a Union Cabinet Minister nominated by the Prime Minister. SciGov

UPSC Mains Practice

"Independence of the electoral machinery is essential for the credibility of a constitutional democracy." Discuss in the context of the appointment process of the Election Commission of India.