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FORTUNE WEEKLY DIGEST

› INDIAN HEATWAVE ›INDIA'S CROP DIVERSIFICATION › DEFECTION AND INDIAN POLITY

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FORTUNE WEEKLY DIGEST

EDITOR'S NOTE

As UPSC aspirants, it is essential to stay updated on current affairs to excel in the examination. This **Fortune Weekly Digest (ForWarD)** brings you the latest news and developments from around the world, carefully curated and analyzed to help you prepare for the Civil Services (Main) Examination.

We understand that time is precious, and we have made sure to present the information in a concise and easy-to-understand manner.

The magazine is divided into different sections. Mains relevant topics have been covered in detail with a UPSC previous year question perspective. The jot downs are examples and interesting facts to enrich your answer writing. Cherrypicks has some key words from the week, helpful again in answer writing and essay. We have also included essay topics and sample questions to help you guage your preparation.

We have designed this magazine to best supplement the daily current affairs notes we have launched by the name of **FIND (Fortune IAS News Daily)** and **FINDER (Fortune IAS News Daily Explainer)** and the **Fortune Prelims Precise** monthly compilation. This magazine will be explained in detail and your queries addressed in a live class we conduct.

At a time when there is no dearth of current affairs materials, our hope is help you get a one-stop solution for all your current affairs needs.

This magazine is a work in progress and your feedback will be appreciated.

We hope that this magazine will serve as a valuable resource for your exam preparation and contribute to your success in the UPSC examination.

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DEFECTION AND INDIAN POLITY

Syllabus: GS II - Parliament and State legislatures

PYQ MAPPING

Q) *The role of individual MPs (Members of Parliament) has diminished over the years and as a result healthy constructive debates on policy issues are not usually witnessed. How far can this be attributed to the anti-defection law which was legislated but with a different intention?* ***(2013)***

WHY IN NEWS

Seven Rajya Sabha MPs of the Aam Aadmi Party—Raghav Chadha, Sandeep Pathak, Ashok Mittal, Harbhajan Singh, Rajinder Gupta, Swati Maliwal and Vikramjit Sahney—**joined the Bharatiya Janata Party**, reducing AAP's Rajya Sabha strength to three members and raising concerns over political defections.

INTRODUCTION

Defection, defined as the act of elected representatives switching political allegiance for personal or political gain, emerged as a major challenge to India's parliamentary democracy. To address this, the Anti-Defection Law was enacted through the **52nd Constitutional Amendment Act, 1985**, aiming to curb political instability and uphold party-based governance.

SHORT TAKES

- **Party whip**: A formal directive issued by a political party to its legislators, instructing them on how to vote or whether to be present during important proceedings in the legislature; defying it can attract disqualification under the Anti-Defection Law.
- **Horse trading**: Refers to unofficial and often unethical political bargaining where legislators are induced through money, posts, or other benefits to switch allegiance or support another party, usually to form or topple a government.

HISTORICAL BACKGROUND

- **Rise of defection politics (1960s–70s):** Political defections became widespread during the coalition era as legislators frequently switched parties to gain power, leading to instability in governments.
- **"Aaya Ram, Gaya Ram" phenomenon (1967):** The case of **Haryana MLA Gaya Lal, who changed parties thrice in a single day,** symbolised the extreme opportunistic nature of Indian politics.
- **Large-scale defections crisis (1967 -1972)**: Nearly **2,000 defections** occurred and about **50% of legislators switched parties.**
- **Impact on democratic governance:** Frequent **government collapses, horse-trading, and erosion of public trust** highlighted the urgent need for institutional regulation.

CONSTITUTIONAL AND LEGAL FRAMEWORK

Insertion of Tenth Schedule (1985):

- The **Anti-Defection Law** was incorporated into the Constitution through the **52nd Amendment,** providing a legal basis for disqualification of defectors.
- The amendment **formally introduced the concept of "political party"** into the Constitution.

Key Provisions:

- A legislator is **disqualified if they voluntarily give up party membership** or **vote/abstain against the party whip** without prior permission.
- **Independents are disqualified if they join any political party** after election, ensuring they remain neutral.
- **Nominated members** are allowed to join a political party **within six months**, after which such action attracts disqualification.
- **Disqualification does not apply if at least two-thirds of members agree to merge with another party**, although this provision has been controversial.
- The **Speaker or Chairman has the power to decide** disqualification cases, and their decisions are subject to judicial review.

Strengthening through 91st Amendment (2003):

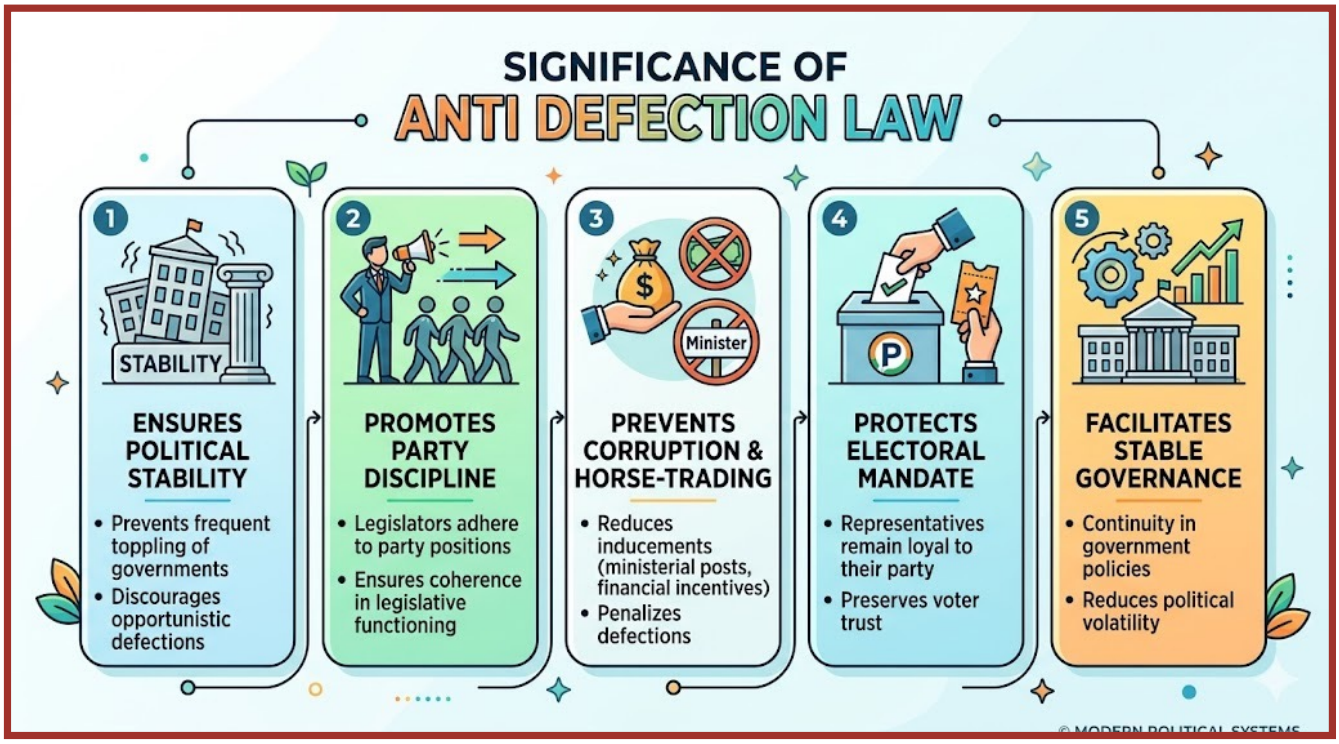
- **Deleted the split provision**, which **earlier**

allowed one-third of legislators to defect without disqualification as it was widely misused

- **Retained the merger clause**
- **Disqualified defectors from holding ministerial office** to reduce incentives for defections.

Scope and applicability:

- The law applies to **Members of Parliament and State Legislatures,** ensuring uniformity in regulating defections across India.



IMPORTANT JUDGEMENTS

- **Kihoto Hollohan v. Zachillhu (1992):** The Supreme Court **upheld the constitutional validity** of the Anti-Defection Law and **allowed judicial review** of the Speaker's decisions.
- **Ravi S. Naik v. Union of India (1994):** The Supreme Court of India held that **"voluntarily giving up membership"** under the Tenth Schedule has a broad meaning, and **can be inferred from a legislator's conduct** even without a formal resignation.
- **Nabam Rebia v. Deputy Speaker (2016):** The Court held that the **Speaker cannot decide** disqualification cases when a **motion for their removal is pending.**
- **Keisham Meghachandra Singh case (2020):** The Court directed that disqualification petitions should **ideally be decided within three months** to avoid delays.

RECENT INCIDENTS

- **AAP Rajya Sabha Merger (April 2026):** Seven out of ten AAP Rajya Sabha MPs, including Raghav Chadha and Harbhajan Singh, shifted allegiance and invoked the two-thirds merger clause to avoid disqualification.
- **Manipur Realignment (2025–26):** In Manipur, five of six JD(U) MLAs joined the Bharatiya Janata Party, invoking the merger clause to avoid disqualification which enabled the BJP to secure a majority (37/60 seats) and form the government under Y. Khemchand Singh in February 2026
- **Himachal Pradesh Assembly Crisis (2024):** In Himachal Pradesh, six Congress MLAs cross-voted in Rajya Sabha elections and were disqualified by the Speaker for defying the party whip.

CHALLENGES

- **Misuse of merger clause:** The 2/3rd provision allows **bulk defections**, which undermines the original objective of preventing political opportunism.
- **Speaker's partisanship:** Since the Speaker belongs to a political party, decisions are often perceived as biased.
- **Delay in decision-making:** The **absence of a statutory time limit** allows Speakers to delay rulings, affecting political outcomes.
- **Erosion of legislative independence:** Legislators are bound by party whip, limiting their ability to exercise independent judgment.
- **Ambiguity in provisions:** Terms like "voluntarily giving up membership" lack clear definition, leading to interpretational issues.
- **Failure to fully curb defections:** Despite the law, defections continue through legal loopholes, indicating limited effectiveness.

WAY FORWARD

- **Introduce time-bound decisions:** A fixed timeline (e.g., 3 months) should be mandated for the Speaker to decide disqualification cases.
- **Shift power to independent body:** Experts and courts have suggested transferring decision-making power to an **independent tribunal or the Election Commission.**
- **Reform merger clause:** A **"twin test"** requiring both organisational and legislative merger should be strictly enforced to prevent misuse.
- **Limit scope of whip:** The **whip should be restricted to crucial votes** like confidence motions to preserve legislative debate.
- **Strengthen intra-party democracy:** Internal party reforms can reduce authoritarian decision-making and improve accountability.
- **Clarify legal definitions:** Clear statutory definitions should be introduced to reduce ambiguity and litigation.

CONCLUSION

Although the Anti-Defection Law has curtailed individual defections, it has not fully eliminated the problem, as **defections now often occur through legal mechanisms like mergers.** Hence, the law must evolve to address modern forms of defection while **safeguarding democratic dissent and legislative autonomy.**

SAMPLE QUESTION

Q) Evaluate the effectiveness of the Anti-Defection Law in preventing political instability in India with suitable examples. **(10 marks) (150 words)**

ECONOMY IN THE GOLDILOCKS

Syllabus: GS III - Indian Economy

PYQ MAPPING

Q) *Do you agree with the view that steady GDP growth and low inflation have left the Indian economy in good shape? Give reasons in support of your arguments* ***(2019)***

WHY IN NEWS

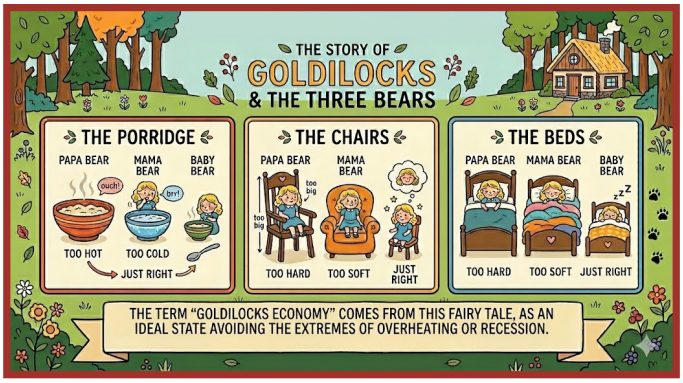
In **February 2026**, the Indian economy was termed a "rare Goldilocks period" by **Sanjay Malhotra**, Governor of the RBI during the Union Budget. However, subsequent data and global headwinds have weakened this optimistic outlook.

INTRODUCTION

A Goldilocks economy refers to a macroeconomic condition where growth is steady, inflation is moderate, and external balances remain stable, creating an ideal "just right" environment. It is generally a temporary phase in the business cycle where macroeconomic variables align to support sustainable expansion without overheating or stagnation.

MEANING AND CONCEPT

- A **Goldilocks economy** refers to a macroeconomic situation where the economy is in a **"just right" equilibrium** i.e neither overheating (high inflation) nor underperforming (recession).
- Key idea- **Growth is strong enough to reduce unemployment but not so fast that it triggers inflationary pressure.**
- It is generally considered a **cyclical and temporary phase**, not a permanent condition of an economy.



KEY FEATURES

- **Stable and Moderate GDP Growth:** Economy expands steadily without sharp boom-bust cycles.
- **Low and Stable Inflation:** Price levels remain within a predictable range, preserving purchasing power.
- **Healthy Employment Levels:** Job creation is sufficient to keep unemployment low.
- **Balanced Monetary Policy:** Central bank maintains neutral interest rates supporting both growth and inflation control.
- **Strong Consumer Demand:** Stable income and confidence support consumption-led growth.
- **Financial Market Stability:** Reduced volatility in equity and bond markets.
- **Macroeconomic Equilibrium:** Avoids extremes of overheating and stagnation.

GOLDILOCKS ECONOMY IN INDIAN CONTEXT

- **Balanced macroeconomic condition:**
  - India was in a Goldilocks-like phase with
    - **Gross Domestic Product (GDP) growth at ~7.6% (2025–26)**
    - **Consumer Price Index (CPI) inflation around 2%,**
    - **Current Account Deficit (CAD) near 1% of GDP and**
    - **Fiscal consolidation by the Centre**.
- **West Asia geopolitical shock:**
  - The **West Asia crisis** triggered sharp **increases in global crude oil prices** and disrupted international energy supply chains, breaking earlier macro stability.
  - India imports around **88% of its crude oil requirement**, with nearly **51% sourced from West Asia**, making the economy highly sensitive to global oil shocks.
- **Revision in growth outlook:**
  - GDP growth projections were revised downward from **~7.2% to ~6.7%**, due to higher input costs & global uncertainty

- CPI inflation is expected to rise to **~4.6% (from an earlier estimate of 4.3%)**
- The **Current Account Deficit (CAD)** is projected to widen to **~2.1% of GDP**

Policy cushioning measures:

- The government reduced **excise duty on petrol and diesel**, while **Oil Marketing Companies (OMCs)** absorbed part of the shock, limiting immediate transmission to retail inflation.

Capital account stress:

- India witnessed **Foreign Portfolio Investment (FPI) outflows of about $17 billion in 2025–26** and weak net Foreign Direct Investment (FDI).

Fiscal and currency pressure:

- **Fiscal burden** is estimated at **~0.5% of GDP due to subsidy pressures and revenue loss.**
- The **Indian rupee faces depreciation pressure** due to widening CAD and weak capital inflows, despite forex reserves of around $500–700 billion.

LIMITATIONS AND RISKS

- **Temporary Nature:** Historically, Goldilocks phases do not last long and are disrupted by shocks.
- **External Vulnerability:** Oil price shocks, global recessions, or geopolitical tensions can destabilise equilibrium.
- **Asset Bubbles Risk:** Excess liquidity may inflate housing or stock market bubbles.
- **Complacency in Policy:** Over-optimism may delay necessary tightening or reforms.
- **Unequal Gains:** Benefits may not reach the informal sector or rural economy equally.
- **Global Spillovers:** Tight monetary policies in advanced economies can disrupt capital flows in emerging markets.

GLOBAL EXPERIENCES

United States (1990s):

- The "Roaring 1990s" under **Alan Greenspan** (Chairman of the **U.S. Federal Reserve**, 1987–2006) saw steady **GDP growth (3–4%)**, low **unemployment**, and **inflation near 2%**.
- This balance was driven by a **productivity surge** from the **internet revolution**, leading the **dot-com boom**, which ended with the **2000 tech crash**.

United Kingdom (1993–2007):

- The UK's "**NICE**" (Non-Inflationary Consistent Expansion) phase featured **stable growth** and **low inflation**, supported by **Bank of England independence** and strong **financial sector expansion**.
- This period of macroeconomic stability, part of the **Great Moderation**, ended with the **2008 global financial crisis** due to rising **debt levels**.

WAY FORWARD

- **Strengthen Macroeconomic Coordination:** Better alignment between RBI (monetary policy) and government (fiscal policy).
- **Inflation Management:** Improve food supply chains, storage infrastructure, and logistics efficiency.
- **Employment-Centric Growth:** Promote labour-intensive manufacturing and MSME growth.
- **Structural Reforms:** Land, labour, and financial sector reforms to boost productivity.
- **External Sector Resilience:** Diversify exports and reduce dependence on imported energy.
- **Investment in Human Capital:** Education, skilling, and health to improve long-term growth potential.
- **Financial Stability Monitoring:** Early detection of asset bubbles and credit risks.
- **Inclusive Growth Strategy:** Ensure benefits of macro stability reach informal and rural sectors.

CONCLUSION

A Goldilocks phase, though economically desirable, is inherently fragile as it depends on favourable global and domestic conditions simultaneously. Its sustainability requires continuous policy calibration to manage inflation, growth, and external shocks without allowing macroeconomic imbalances to build up.

SAMPLE QUESTION

Q) "A Goldilocks economy represents an ideal but inherently unstable macroeconomic equilibrium." Examine
(15 marks) (250 words)

INDIAN HEATWAVE: IMPACT AND SOLUTIONS

Syllabus: GS I - Important Geophysical phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc

PYQ MAPPING

Q) *Bring out the causes for the formation of heat islands in the urban habitat of the world.* ***(2013)***

WHY IN NEWS

India has seen a **five-year high in early peak electricity demand**, driven by intense **heatwave conditions** increasing cooling needs across the country.

INTRODUCTION

Heatwaves are **periods of abnormally high temperatures that significantly exceed normal climatic conditions,** often lasting for several days and causing widespread environmental, health, and economic stress. In India, their frequency, intensity, and geographical spread are increasing due to climate change, rapid urbanisation, and changing atmospheric circulation patterns

SHORT TAKES

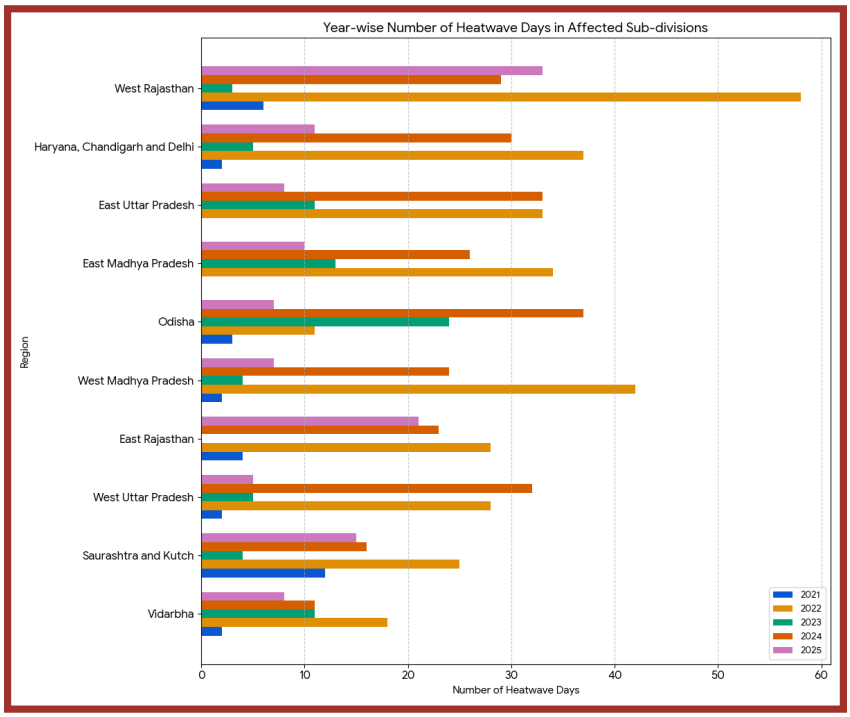
- **Heat Action Plan (HAP)**
  - A **preparedness framework used by states and cities** to reduce the health and social impact of heatwaves through early warnings, public advisories, and emergency response measures.
  - In India, around 23 states have implemented HAPs which mostly follow a standardized framework originally pioneered by the **Ahmedabad Municipal Corporation** in 2013.

WHAT IS A HEATWAVE?

- A **heatwave** is an **abnormal and sustained rise in maximum temperature** above the normal climatological value for a region.
- As per **India Meteorological Department (IMD)** definition:
  - **Departure from normal temperature:** Heatwave occurs when temperature is **4.5°C to 6.4°C above normal**, and **severe heatwave when > 6.4°C above normal**.
  - **Based on absolute high temperature:** A heatwave is declared when the **maximum temperature exceeds 45°C**, and a **severe heatwave when it exceeds 47°C**.
- Conditions must be met in **at least two stations within a meteorological sub-division** for **two consecutive days**, and it is declared on the **second day**.
- Absolute temperature thresholds:
  - Plains: **≥ 40°C**
  - Hilly regions: **≥ 30°C**
  - Coastal regions**: Temperature is ≥ 37°C and 4.5°C or more above normal.**
- **Peak season**: Mostly **March to June**, with **May being the peak month**.
- The IMD uses a **nationwide network of surface observatories** and compares daily data with **1991–2020 climatological normals**.

RECENT TRENDS OF HEATWAVES IN INDIA

- **Hottest Decade on Record:** The period from **2015 to 2025** was the warmest decade ever recorded in India, with the national mean temperature increasing by roughly **0.9°C** since 1901.
- **Rising Minimum Temperatures:** Minimum (nighttime) temperatures are rising faster (**+0.97°C**) than maximum daytime temperatures (**+0.88°C**), narrowing the daily temperature range and preventing nocturnal cooling.
- **Mortality and Health:** While the **government reported 459 heat-related deaths** in 2024, independent analysts estimated over **733 deaths** and 40,000 heatstroke cases.
- **Expansion of geographic spread**:
  - Traditional core zone: **Rajasthan, Gujarat, Punjab, Haryana, MP**
  - Now expanding to: **Odisha, Bihar, Jharkhand,** parts of **peninsular India (Telangana, Andhra Pradesh, Tamil Nadu)**
- **Early onset of heatwaves**: Heatwaves now observed as early as **February–March in some years**.
- **Rising heatwave days (IMD observations)**: Northwest India often experiences **5–6 days historically**, now projected to **double in some seasons (10–12 days)** in certain years.
- **Urban amplification**: Cities experiencing **"night heatwaves"**, where night temperatures remain abnormally high, reducing recovery time.



CAUSES

Global Warming & Climate Change:

- **Rising greenhouse gas concentrations** trap outgoing heat, steadily increasing Earth's baseline temperature.
- This makes **heatwaves more frequent, intense, and longer-lasting**, as even normal weather patterns now produce extremes.

Atmospheric Pressure Systems:

- Persistent **high-pressure systems (anticyclones)** cause sinking air, clear skies, and intense solar heating at the surface.
- **El Niño conditions** weaken monsoon circulation and reduce cloud formation, increasing land surface heating and dryness.

Regional Dryness & Land–Atmosphere Feedback:

- **Low soil moisture** reduces evaporative cooling, so more solar energy directly heats the land surface.
- **Delayed monsoon and dry pre-monsoon conditions** intensify heat accumulation, especially in north and central India.

Urbanisation & Human-Induced Changes:

- **Urban Heat Island effect** makes cities hotter due to concrete surfaces, traffic emissions, and reduced vegetation.
- **Deforestation and waste heat from industries/ ACs** further increase local temperatures and amplify heat stress.

IMPACT

- **Human health impact:** Heatwaves cause heatstroke, dehydration, and cardiovascular stress, especially among the elderly, children, and outdoor workers.
  - **Eg**-2015 heatwave in Andhra Pradesh & Telangana caused 2,500+ deaths.
- **Agriculture:** Leads to crop failure, moisture stress, and lower yields of wheat and rice; also reduces livestock productivity.
  - Eg: 10–30% drop in milk yield due to bovine heat stress.
- **Economic:** Reduces labour productivity in outdoor sectors and increases electricity demand for cooling.
- **Urban & infrastructure:** Causes water scarcity, power outages, and stress on roads and railways.
- **Environment:** Increases forest fires, evaporation, and biodiversity stress.
  - **Eg**- Simlipal fires in Odisha linked to pre-monsoon heatwaves.

CHALLENGES

- **Weak legal & policy framework:** Heatwaves are not fully notified as disasters under the Disaster Management Act, 2005, limiting funds and institutional support.
- **Ineffective Heat Action Plans (HAPs):** Many states have HAPs but lack funding, legal backing, and accountability, leading to weak implementation.
- **Poor data & monitoring:** Underreporting of heat-

related illness and deaths, along with weak district-level vulnerability mapping.

- **Weak coordination:** Fragmented response among IMD, NDMA, state agencies, health departments, and urban bodies.
- **Socio-economic & urban vulnerability:** Informal workers, slum dwellers, and outdoor labourers face high exposure due to poor cooling access, weak urban planning, and limited green infrastructure.

SOLUTIONS

- **Strengthening Early Warning Systems**: Expand **IMD's district-level forecasting and heat index-based alerts** for accurate, localized warnings.
- **Scaling Heat Action Plans (HAPs)**: Make **district-level Heat Action Plans mandatory with funding and inter-agency coordination**, based on NDMA guidelines.
- **Urban Cooling Interventions:** Promote **cool roofs, reflective surfaces, urban forests, and green corridors** to reduce urban heat island effects.
    - **Eg**- Applying solar-reflective paint or tiles can reduce indoor temperatures by **3°C to 5°C**.
- **Public Health Preparedness:** Establish **heatstroke treatment units, ORS distribution systems, and trained frontline health workers** for rapid response.
- **Labour Protection Measures**: Implement **shifted working hours, mandatory rest breaks, and shaded workplaces** for outdoor and informal workers.
    - **Eg**- Moving heavy construction work to early morning (5 AM – 10 AM) and late evening (5 PM – 9 PM).
- **Long-term Climate & Resilience Strategy:** Integrate **heat risk into urban planning** and climate action, while reducing greenhouse gas emissions for long-term mitigation.

CONCLUSION

Heatwaves are no longer isolated seasonal events but are emerging as a major climate risk requiring urgent and coordinated action. Strengthening early warning systems, climate-resilient infrastructure, and adaptive governance is essential to reduce vulnerability and build a heat-resilient India.

SAMPLE QUESTION

Q) "Climate change has transformed heatwaves from occasional events into recurring disasters." Examine with reference to India
(10 marks) (150 words)

ACCELERATING INDIA'S HIGH VALUE CROP DIVERSIFICATION

Syllabus: GS III - Agriculture

PYQ MAPPING

Q) *Given the vulnerability of Indian agriculture to vagaries of nature, discuss the need for crop insurance and bring out the salient features of the Pradhan Mantri Fasal Bima Yojana (PMFBY)* ***(2016)***

Q) *Explain various types of revolutions, took place in Agriculture after Independence in India. How have these revolutions helped in poverty alleviation and food security in India?* ***(2017)***

WHY IN NEWS

The Union Budget 2026–27 has announced region-specific promotion of high value crops such as coconut, cashew, cocoa, agarwood and temperate nuts to enhance farm incomes and diversify agriculture.

INTRODUCTION

High value crop diversification is a strategic shift in Indian agriculture aimed at enhancing farmer incomes and improving productivity. It leverages agro climatic advantages to promote sustainable, export oriented and nutrition rich farming systems.

HORTICULTURE AS THE ENGINE OF AGRICULTURAL GROWTH

- Contributes about 37 percent of Gross Value Output in agriculture.
- Production increased from 277.35 million tonnes in 2013–14 to 370.74 million tonnes in 2024–25.
- Vegetables contribute 217.80 million tonnes and fruits 117.65 million tonnes.
- India ranks second globally in fruits and vegetables production.
- Accounts for 9.18 percent of global fruits and 8.18 percent of vegetables production.
- Largest producer of onions with around 22.42 percent global share.
- Supports export growth and agro processing industries

REGIONALLY ANCHORED CROP DIVERSIFICATION STRATEGY

The government is promoting location specific high value crops based on agro climatic advantages

- Coastal regions focus on coconut, cashew, cocoa and sandalwood.
- The North Eastern region focuses on agarwood plantation and agroforestry.
- Himalayan and hilly regions focus on walnuts, almonds and pine nuts.
- Strategy aims to enhance productivity, value addition and export competitiveness.
- Encourages crop diversification away from cereals.
- Promotes integration with global value chains.
- Supports sustainable and climate resilient agriculture

COASTAL PLANTATION CROPS AND THEIR ECONOMIC ROLE

- **Coconut:** supports around 30 million people including 10 million farmers.
  - India contributes 22.44 percent of global coconut production.
- **Cashew:** cultivated in 12.05 lakh hectares with production of 8.02 lakh tonnes
  - Cashew exports stood at USD 369.17 million in 2024–25
- **Cocoa:** production reached 32.91 thousand tonnes with exports of USD 295.58 million

NORTH EASTERN REGION AND AGARWOOD ECONOMY

- Agarwood is emerging as a high value agroforestry crop in the North East.
  - India has around 150 million agarwood trees with 90 percent in the North East.
  - Tripura alone has a turnover potential of about Rs 2000 crore.
- Government promoting geospatial mapping and export facilitation.
  - Development of value added products like oil, beads and tea.

HIMALAYAN NUT CROPS AND LIVELIHOOD ENHANCEMENT

- Temperate nut crops provide high returns in hilly regions.
- Walnut production reached 3.22 lakh tonnes in 2024–25.
- Almond production at 13.94 thousand tonnes with 83 percent from Jammu and Kashmir.
- Chilgoza pine supports tribal livelihoods in Himachal Pradesh.

SIGNIFICANCE OF HIGH VALUE CROP DIVERSIFICATION

- **Income Enhancement:** High-value crops generate higher returns per hectare, improving farmer profitability; ***Example:*** cashew cultivation transforming low-value wastelands in Maharashtra into productive assets.
- **Export Promotion:** Plantation and nut crops strengthen India's agricultural exports and global competitiveness; ***Example:*** rising coconut product exports from Kerala boosting foreign exchange earnings.
- **Employment Generation:** These crops create large-scale jobs in cultivation, processing, and logistics sectors; ***Example:*** coconut-based industries supporting livelihoods in Tamil Nadu.
- **Nutritional Security:** Nut and plantation crops enhance dietary diversity and improve health outcomes; ***Example:*** promotion of walnut cultivation in Jammu and Kashmir.
- **Climate Resilience:** Diversified cropping systems reduce risk and improve ecological stability under climate stress; ***Example:*** agroforestry-based agarwood cultivation in Tripura.

LIMITATIONS AND CHALLENGES

- **Fragmented Landholdings:** Small and scattered farms restrict economies of scale and mechanisation; ***Example:*** small coconut growers in Kerala face productivity constraints.
- **Infrastructure Deficit:** Inadequate cold storage and processing facilities lead to high post-harvest losses; ***Example:*** fruit and vegetable wastage due to weak logistics in Uttar Pradesh.
- **Market Volatility:** Price fluctuations create income uncertainty for farmers dependent on global demand; ***Example:*** unstable cashew prices affecting growers in Goa.
- **Technology Gaps:** Limited access to quality planting material and modern practices reduces productivity; ***Example:*** ageing coconut plantations in Tamil Nadu lowering yields.
- **Export & Regulatory Barriers:** Stringent quality standards and limited branding hinder global market access; ***Example:*** regulated agarwood trade under international norms impacting producers in Tripura.

WAY FORWARD

- **Value Chain Development** – Strengthen processing, branding, and export linkages to maximise farmer income from high-value crops; ***Example:*** boosting coconut-based product exports through value addition hubs in Kerala.
- **Market Diversification** – Expand access to global markets and niche demand segments for plantation and nut crops; ***Example:*** promoting virgin coconut oil and cocoa products in international markets via APEDA initiatives.
- **Agro-processing Infrastructure** – Develop rural processing clusters and cold chains to reduce post-harvest losses; ***Example:*** cashew processing units in Goa enhancing local employment.
- **Climate-smart Cultivation** – Promote agroforestry and diversified cropping systems to improve resilience and sustainability; ***Example:*** integrating cocoa with coconut plantations in Karnataka.
- **Farmer Capacity Building** – Provide training, credit, and extension support for adoption of high-value crops and modern practices; ***Example:*** skill development programmes for agarwood cultivation in Tripura.

CONCLUSION

High value crop diversification holds the potential to transform Indian agriculture into a high income and globally competitive sector. A balanced approach addressing infrastructure, market and sustainability challenges is essential to fully realise its benefits.

SAMPLE QUESTION

Q) "High value crop diversification is emerging as a key strategy to enhance farmers' income and promote sustainable agriculture in India."Discuss the significance of this approach in the context of region-specific agricultural planning. Also examine the challenges associated with its implementation and suggest suitable measures to address them. **(15 marks) (250 words)**

WEEKLY DOSSIERS

WHAT IT TAKES TO MOVE HEAT ACTION PLANS FROM ADVISORIES TO MANDATES

Introduction

- **Heat Action Plans (HAPs)** in India have largely remained **advisory**, limiting effectiveness; there is now a shift toward making them **enforceable**, **data-driven**, and **integrated into governance systems**.

Key Challenges

- Lack of **clear institutional ownership** leads to **weak accountability** and **fragmented implementation** across departments.
- **Inadequate and uncertain financing** constrains large-scale **climate adaptation** measures.
- **Weak data systems** limit **real-time monitoring** and **evidence-based policymaking**.
- **One-size-fits-all approaches** fail to address **localised heat vulnerabilities**.
- **Limited administrative capacity** hampers effective **execution of climate plans**.

Emerging Innovations and Best Practices

- Integration of **climate goals into governance frameworks** improves **accountability and continuity**.
- Creation of nodal agencies like Tamil Nadu Green Climate Company ensures **focused implementation**.
- Use of digital tools like India Climate and Energy Dashboard enables **tracking, transparency, and data-driven decisions**.
- Adoption of **decentralised, city-specific planning** enhances effectiveness of interventions.
- **Inter-departmental coordination** through **responsibility matrices** strengthens execution capacity.

Significance

- **Legal backing** to HAPs ensures **accountability and compliance** among implementing agencies.
- Strengthens **urban resilience** against rising **heatwaves and climate risks**.
- Enables **efficient allocation and utilisation of financial resources**.
- Aligns **climate adaptation** with broader **development and infrastructure planning**.
- Promotes **proactive** rather than **reactive disaster management** strategies.

Way Forward

- Provide **statutory status** to Heat Action Plans to ensure **enforceability**.
- Institutionalise **climate budgeting** to track and prioritise **climate expenditure**.
- Strengthen **real-time data systems** and **public dashboards** for monitoring progress.
- Promote **localised planning** tailored to **micro-climatic conditions**.
- Develop **innovative financing** by combining **public, private, and international funds**.
- Build **administrative capacity** through training and collaboration with **expert institutions**.

Conclusion

- Moving **Heat Action Plans** from **advisories to mandates** requires **strong institutions**, **reliable financing**, and **data-driven governance**, ensuring that **climate resilience** becomes an integral part of India's **development trajectory**.

INVASIVE SPECIES

Why in News

- Recent large-scale drives to remove invasive alien species like Prosopis juliflora and Lantana camara have sparked debate on whether focusing only on removal ignores deeper ecological changes driving their spread.

Introduction

- Invasive Alien Species (IAS) are increasingly targeted as ecological threats, but emerging evidence suggests they are often **symptoms of deeper environmental degradation** rather than the root cause.

Key Issues / Challenges

- **Misdiagnosis of the Problem:** Focusing only on IAS removal ignores **underlying drivers** like **land-use change, climate change, and soil degradation**.
- **Pre-existing Ecological Damage: Colonial forestry, plantations, and urbanisation** had already degraded ecosystems before IAS spread.
- **Policy and Economic Drivers: Agricultural intensification, fertiliser use, and irrigation changes** have altered ecosystems, favouring invasive species.
- **High Cost, Low Effectiveness:** Large-scale removal is **resource-intensive** but often fails to ensure **ecological restoration**.
- **Ecological Vacuum Problem:** Removing IAS without restoring ecosystems creates **vacant niches**, allowing reinvasion or new invasions.

Emerging Insights / Best Practices

- Recognition that IAS like Senna spectabilis may act as **"ecological first responders"** in degraded landscapes.
- Understanding **ecosystem processes** (soil, water, nutrients) rather than just species composition improves restoration outcomes.
- Shift toward **landscape-level and long-term ecological monitoring** instead of short-term clearance targets.
- Emphasis on **community-led and context-specific restoration practices**.
- Integration of **traditional ecological knowledge** with scientific approaches.

Significance

- Highlights need for **holistic ecosystem restoration** instead of species-centric approaches.
- Improves **policy effectiveness** by addressing root causes of ecological degradation.
- Ensures **sustainable biodiversity conservation** in changing climatic conditions.
- Prevents **wasteful expenditure** on ineffective large-scale removal drives.
- Promotes **adaptive management** in the face of dynamic environmental changes.

Way Forward

- Shift from **eradication-centric policies** to **process-based ecological restoration**.
- Address **drivers like land-use change, nutrient loading, and hydrological alterations**.
- Promote **phased and selective removal** of IAS based on ecological context.
- Strengthen **community participation and local stewardship** in restoration efforts.
- Invest in **long-term ecological monitoring and research**.
- Align conservation with **livelihoods and sustainable land management practices**.

Conclusion

- Invasive species are often **symptoms of deeper ecological transformations** driven by human activity. Effective conservation requires moving beyond removal to **understanding and restoring underlying ecosystem processes**, ensuring resilient and sustainable landscapes.

DECENTRALISED MENTAL HEALTHCARE IN INDIA

Introduction:

- India's mental healthcare system is marked by a **large treatment gap and medication-heavy approach**, highlighting the need for **decentralised, community-based therapy models**.

Significance of Decentralised Therapy

- **Bridging Treatment Gap:** Expands access to care in underserved areas where specialists are scarce, e.g., rural districts using **community health workers**.
- **Holistic Care:** Combines **psychosocial support with medication** for better outcomes, e.g., counselling alongside antidepressants.
- **Cost-Effective:** Reduces dependence on expensive specialist care, e.g., **task-sharing models** lowering treatment costs.
- **Early Intervention:** Addresses mild distress before escalation into disorders, e.g., counselling for early anxiety cases.
- **Community Engagement:** Utilises local networks and

volunteers for support, e.g., **Atmiyata Programme in Gujarat**.

Key Challenges

- **Specialist Shortage:** Limited psychiatrists and therapists restrict access, e.g., low psychiatrist-to-population ratio in India.
- **Over-Prescription:** Medication often becomes the default treatment, e.g., antidepressants prescribed without counselling.
- **Weak Follow-up:** Poor continuity of care affects recovery, e.g., patients dropping out after initial consultation.
- **Urban Bias:** Services are concentrated in cities, e.g., lack of therapy centres in rural areas.
- **Low Awareness:** Stigma and poor mental health literacy hinder help-seeking, e.g., reluctance to seek therapy.

Way Forward

- **Task-Sharing Expansion:** Train non-specialist counsellors at scale, e.g., community volunteers delivering therapy.
- **Primary Care Integration:** Embed mental health services in PHCs, e.g., counselling units at health centres.
- **Safeguards:** Ensure referral systems and supervision, e.g., escalation to psychiatrists in severe cases.
- **Stepped Care Promotion:** Prioritise therapy before medication in mild cases, e.g., CBT as first-line treatment.
- **Training Capacity:** Increase psychotherapy education and seats, e.g., expanding clinical psychology programs.

Conclusion:

- **Decentralised therapy** can bridge India's mental healthcare gap by ensuring **accessible, affordable, and balanced care**, where **psychosocial interventions complement—not replace—medication**, leading to sustainable mental well-being.

BEYOND VERDICTS: KEY JUDICIAL INTERVENTIONS

Strengthening Access to Education under RTE

- The Supreme Court of India, in the **'Lucknow Public School vs. State of Uttar Pradesh & Ors'** case, upheld that **neighbourhood schools must provide immediate admission** to eligible children under the Right to Education Act, 2009, reinforcing children's **fundamental right to free and compulsory education**.

Medical Negligence Liability Extends to Legal Heirs

- The Supreme Court of India ruled that in cases of **medical negligence under the Consumer Protection Act**, the **legal heirs of a deceased doctor can be impleaded in ongoing proceedings**, but their liability is **strictly limited to the extent of the estate inherited** from the deceased.
- The Court clarified that while **claims for pecuniary losses survive** under Indian Succession Act, 1925 (Section 306), **purely personal injury claims abate** after death. It upheld the view that courts must first establish negligence and then determine whether the claim is recoverable from the **estate**, ensuring heirs are not personally liable beyond inherited assets.

Dowry Deaths Remain a Serious Social Issue

- The Supreme Court of India highlighted that **dowry deaths continue to be a grave social problem**, particularly in Uttar Pradesh, Bihar, and Karnataka, while **setting aside the bail** granted to an accused husband in a dowry death case.
- The Court noted that **dowry demands often escalate after marriage**, leading to harassment, forced suicides, or killings, despite social progress. It stressed that **bail courts must exercise caution in such serious offences**, considering their wider societal impact, and underscored the persistence of dowry as a **deeply entrenched social**

evil affecting women's safety and dignity.

Supreme Court Flags Rise in Unwanted Pregnancies; Drops Contempt Case

- The Supreme Court of India observed a **rising trend of unwanted pregnancies** while dropping contempt proceedings against All India Institute of Medical Sciences and the Centre after compliance with its order permitting termination of a **30-week pregnancy of a minor**.
- The Court reiterated that forcing continuation of such pregnancy would violate **Article 21 (right to life and dignity)**, and stressed that **delays, social stigma, and lack of awareness** often push minors to seek late-term interventions.
- It also highlighted the risk of women turning to **unsafe, unqualified practitioners** if access to legal medical termination is restricted, and called for **greater awareness, possible legal reforms, and stronger institutional response** to address the issue.

Challenge to Transgender Rights (Amendment) Act, 2026 – Supreme Court Notice

- The Supreme Court has issued notice to the Union and States on petitions challenging the constitutional validity of the Transgender Persons (Protection of Rights) Amendment Act, 2026.
- The petitioners argue that the law undermines the right to self-identification of gender recognised in the **NALSA v. Union of India (2014)**, replacing it with a system of medical certification and District Magistrate approval, thereby violating dignity, privacy, and autonomy under Articles 14, 15, 19, and 21.

ETHICS - CASE STUDY

Q) Gokul is a **government school teacher** in a rural district. The school has been under pressure from higher authorities to **improve board exam results**, as rankings affect funding and reputation.

During the pre-board examinations, Gokul notices that many students are **struggling academically** due to poor foundational learning and irregular attendance. The school principal informally suggests that teachers should **"support students during exams"** to ensure better results.

On the day of the exam, Gokul observes some teachers **allowing copying and even dictating answers** to students. He is aware that if he strictly enforces rules, his class results may be poor, and he may face **administrative pressure, isolation from colleagues, and negative performance reviews**.

At the same time, Gokul believes that such practices **undermine integrity, harm students' long-term learning, and erode trust in the education system**.

Questions:

a. **Identify the ethical issues involved in the above case.**

b. **What are the options available to Gokul? Evaluate their merits and demerits.**

c. **What should Gokul do in this situation? Justify your answer with ethical reasoning.**

d. **Suggest systemic reforms to address such issues in the education system.**

ETHICS - EXAMPLES

1. **Professional Ethics:** Rajasthan Royals captain Riyan Parag has been fined 25% of his match fee and given a demerit point after being seen vaping in the dressing room during an IPL match against Punjab Kings, breaching the code of conduct for "bringing the game into disrepute." E-cigarette use for nicotine is illegal in India.
2. **Gender Rights:** The Supreme Court held that in cases of child rape, a minor cannot be compelled to continue a pregnancy and allowed termination of a 30-week pregnancy, while urging the Centre to amend the law permitting abortion beyond the 20-week limit in such exceptional cases.
3. **Lack of Integrity**: Tiara Rose Mary, the 3rd Additional Munsiff Magistrate at Thrissur, was suspended by the Kerala High Court in April 2026 due to allegations of submitting forged documents for a fake medical reimbursement claim. The suspension follows a preliminary inquiry that found irregularities in the documents.
4. **Compassion**: At 11,000 feet in Lahaul-Spiti, Dorje Bodh and Hishe Chhomo—known as "Chacha" and "Chachi"—run a small roadside dhaba that serves as a critical refuge for trekkers and travellers stranded in extreme weather conditions. Over decades, the dhaba has evolved into a lifesaving shelter, notably housing over 100 stranded tourists in 1998 and around 80 people during a 2021 blizzard.
5. **Environmental Ethics**: In Kikruma village, Phek district (Nagaland), the **Zabo farming system** uses forests, hand-dug rainwater ponds (***Rüza***), and terraced fields to harvest and channel water sustainably. It integrates forestry, livestock, and farming through community-managed runoff that enriches soil and prevents erosion.
6. **Lack of Empathy:** A viral video from Katihar, Bihar showed Anganwadi worker Premlata Hembram attending duty with an IV drip still attached as her illness was questioned by the Child Development Project Officer (CDPO), who reportedly demanded physical verification and threatened job consequences.
7. **Resilience**: Irfan Ahmad Lone from Naidkhai village, Bandipora (J&K) secured AIR 957 in UPSC CSE 2025 despite being visually impaired, becoming the first from his district to clear the exam using screen-reading software and assistive technology. He lost vision due to a childhood syringe accident and pencil injury, underwent around 18 surgeries and cleared UPSC in his third attempt
8. **Human Rights**: A man from Keonjhar, Odisha named Jitu Munda reportedly brought his deceased sister's skeletal remains to an Odisha Grameen Bank branch to withdraw over ₹19,000 from her account. The bank denied allegations of procedural lapses, stating that he was intoxicated, misunderstood the settlement process, and refused to follow the claim procedures explained by the branch manager.

MODEL ESSAY

"Art, freedom and creativity will change society faster than politics"

Introduction

- Quote by Victor Pinchuk
- UNESCO recognises artistic freedom as essential for democratic and inclusive societies, as it enables imagination without censorship or fear.
- **Art** includes literature, music, painting, cinema, and digital expression that reflect human experience.
- **Freedom of expression** allows individuals to challenge authority and social norms.
- **Creativity** drives innovation in ideas, culture, and social thought.

How Art Changes Society Faster than Politics

- **Emotional influence:** Art directly shapes emotions (e.g., *Guernica* evokes stronger empathy than policy reports).
- **Mass reach:** Accessible even to illiterate populations through songs, visuals, and theatre.
- **Digital virality:** Social media accelerates spread of memes, music, and visuals.
- **Economic power:** Creative industries contribute ~3.1% of global GDP and millions of jobs.
- **Identity building:** Shapes nationalism, feminism, environmentalism, and other movements.

Historical Evidence

- **Renaissance:** Art and literature challenged medieval thinking; figures like Leonardo da Vinci and Michelangelo advanced humanism.
- **Indian freedom movement:** Literature and theatre shaped nationalism; *Vande Mataram* became a symbol of resistance.

Why Politics Alone is Slower

- Political change requires **bureaucracy, consensus, and institutional approval**.
- Laws can be passed quickly but **social acceptance takes decades**.
- Policies often fail without cultural acceptance.

Challenges of Artistic Influence

- Art can be censored or politicised.
- It can also spread misinformation if misused.
- Commercialisation may dilute its social message.

Way Forward

- **Protect Freedom of Expression**: Safeguard Article 19(1)(a) with minimal censorship and transparent regulation of content.
- **Strengthen Institutional Support:** Increase funding for cultural bodies like Lalit Kala Akademi and support grassroots artists.
- **Integrate Arts in Education:** Promote arts, music, and theatre in schools under NEP 2020 for holistic learning.
- **Use Digital Platforms:** Encourage ethical use of social media and OTT platforms to amplify creative voices.
- **Preserve Cultural Diversity:** Document and support folk, tribal, and indigenous art forms as part of intangible heritage.

Conclusion

- Art, freedom, and creativity act as powerful forces of societal transformation by reshaping emotions, beliefs, and collective consciousness.
- While politics governs systems, it is art that often **reimagines society itself**.

Sample Quotes

- *Conformity is the jailer of freedom and the enemy of growth- John F Kennedy*
- *Growth for the sake of growth is the ideology of the cancer cell - Edward Abbey*
- *Righteousness is the foundation of a good government - Confucius*

MAINS JOT DOWN

GS I: *ART & CULTURE*

- The ongoing excavation at **Virli Khandar** in Maharashtra's Bhandara district (Vidarbha), led by **Dr. Prabash Sahu**, has uncovered unique megalithic burial structures and funerary practices. Preliminary findings date the site to around **2,500 years ago**, situating it within **India's Iron Age megalithic culture**, and offering valuable insights into ancient socio-cultural traditions.

GS II: *HEALTH*

- The World Health Organization released the **Global Hepatitis Report 2026**, highlighting that India is among the **leading contributors to global hepatitis-related deaths**, particularly due to **hepatitis B and C**, underscoring the need for stronger prevention, screening, and treatment strategies.

GS III: *ENVIRONMENT AND ECOLOGY*

- The project **"Strengthening Institutional Capacities for Securing Biodiversity Conservation Commitments"** has been launched by the Ministry of Environment, Forest and Climate Change and the National Biodiversity Authority to enhance grassroots biodiversity governance.
- It is a joint initiative of the Government of India, the Global Environment Facility, and the United Nations Development Programme, with a funding support of **USD 4.88 million** for the period **2025–2030**.
- The project will be implemented in ecologically significant regions, including the **Sathyamangalam landscape** (covering Mudumalai and Sathyamangalam Tiger Reserves) in Tamil Nadu and key biodiversity areas in Meghalaya such as the **Nokrek Biosphere Reserve, Balpakram National Park, and Siju Wildlife Sanctuary**.

GS III: *RENEWABLE ENERGY*

- Prosopis juliflora is being explored as a **feedstock for India's first green methanol plant**, aimed at **fueling ocean-going ships**. It is a **drought- and salinity-resistant leguminous tree**, widely regarded as a **highly invasive species**. Native to **Mexico**, it was introduced in India by the **British in the 1920s** to green Delhi and later expanded by the **Gujarat Forest Department in 1961**, where it spread aggressively across arid regions.

GS III: *AGRICULTURE*

- Sikkim launched the **Sikkim Organic Mission (2010)** and became the **world's first fully organic state in 2016**, earning the **Future Policy Gold Award (2018)** from the Food and Agriculture Organization.
- The model is driven by strong institutional support through **SOCA for certification**, **policy incentives like subsidies and organic inputs**, and **robust market linkages**, enabling farmers to access domestic and global organic markets.

GS III: *INDIAN ECONOMY*

- The **Startup India Fund of Funds (SIFoF) 2.0 Scheme** has been launched by DPIIT to expand startup financing and build on the success of the 2016 Fund of Funds initiative. With a total corpus of **₹10,000 crore**, the scheme is implemented by the **Small Industries Development Bank of India (SIDBI)** under the Ministry of Commerce and Industry.
- It channels funds through **SEBI-registered Alternative Investment Funds (AIFs)** to attract private investment and bridge funding gaps. The scheme focuses on supporting **deep-tech, innovative manufacturing, and early-growth stage startups**, thereby strengthening India's venture capital ecosystem.

- India's manufacturing policy is shifting toward an **Integrated Hub-based development model**, featuring **plug-and-play infrastructure**, **shared utilities**, **regulatory support**, and **multimodal connectivity** to boost efficiency and competitiveness.
- This transition aims to transform the sector—which currently contributes **16–17% of GDP** and employs about **27 million workers**—into a key growth engine, targeting a **25% GDP share** and supporting India's vision of a **$30–35 trillion economy by 2047**.

- The Reserve Bank of India has launched **Mission SAKSHAM**, a **nationwide capacity-building initiative** for **Urban Co-operative Banks (UCBs)**—which operate mainly in urban and semi-urban areas.
- The mission aims to deliver **large-scale training programmes (both in-person and e-learning)** for key stakeholders, including **board members, senior management, and risk, compliance, audit, and IT personnel**.
- It has been **designed in consultation with the Umbrella Organisation of UCBs and cooperative federations**, to strengthen governance, risk management, and operational efficiency across the sector.

GS III: *DEFENCE*

- The Defence Research and Development Organisation has launched the **Vikram VT 21 project**, featuring **wheeled and tracked advanced armoured platforms**.
- It offers **enhanced armour protection**, meeting **STANAG Level 4 and 5 standards** (resistance to heavy gunfire, blasts, and shrapnel), along with **integrated weapons and surveillance systems** and **high mobility**.
- The platform is also **amphibious** and is being developed as a potential solution for the Indian Army's requirement of a **Futuristic Infantry Combat Vehicle (FICV)**.

- The Defence Research and Development Organisation and the Indian Navy successfully conducted the **maiden salvo launch of the Naval Anti-ship Missile-Short Range (NASM-SR)**.
- Developed by DRDO, the missile uses a **solid propulsion booster with a long-burn sustainer**, and is equipped with advanced guidance systems including an **Imaging Infra-Red Seeker for terminal targeting**, a **Fibre Optic Gyroscope-based Inertial Navigation System (INS)**, and a **Radio Altimeter for mid-course navigation**, enhancing its precision and effectiveness in naval warfare.

CHERRYPICKS OF THE WEEK

VELA SUPERCLUSTER

- It is a vast structure of **over 20 galaxy clusters**, spanning about **300 million light-years** and located **800 million light-years from Earth**. Hidden in the Milky Way's **Zone of Avoidance**, it is **more massive than the Laniākea Supercluster**, which contains our galaxy.

B'NEI MENASHE

- They are a Jewish-identifying community from **Manipur and Mizoram**, belonging to the **Mizo-Kuki tribes**, who claim descent from the **"Ten Lost Tribes of Israel" (Tribe of Menashe)** exiled in **722 BC** by the Assyrians. The term *B'nei Menashe* means **"children of Manasseh"**, the son of Joseph.

GEOPHAGY

- It is the practice of **intentionally consuming soil, clay, or earthy materials**, observed in both humans and animals. It is often driven by **nutritional needs (like mineral deficiency), relief from digestive issues, and cultural practices**, and is commonly seen among **children and pregnant women**.

SACRIFICE RATIO

- It measures the **economic cost of reducing inflation**, indicating how much **real GDP is lost for every 1% fall in inflation**.
- It reflects the **trade-off between price stability and economic growth**, where a **higher ratio implies greater short-term pain**, such as **higher unemployment and lower output**.

CYBORG BOTANY

- It is an interdisciplinary field that integrates **living plants with electronic components** (like sensors and conductive materials) to create hybrid systems. It aims to convert plants into **living biosensors**, capable of monitoring their own biochemical signals and environmental conditions. This approach is used in **precision agriculture** to detect **biotic stress** (pests, diseases) and **abiotic stress** (drought, temperature extremes).