Today's Prelims Topics

Haemophilia & Prophylaxis

Context
Prophylaxis is highlighted as the gold standard treatment for haemophilia.

What is Haemophilia A?
- A hereditary bleeding disorder in which blood does not clot properly.
- Caused by a deficiency of **Factor VIII**, an essential clotting protein.

Cause & Clotting Process
- Normal blood clotting involves a **coagulation cascade** with ~20 clotting factors.
- Missing or malfunctioning factors increase the risk of excessive bleeding.
- In Haemophilia A, the body produces **insufficient Factor VIII**.

Genetic Transmission
- Usually inherited through an altered gene from parents.
- **Males** with the altered gene show symptoms.
- **Females** are often carriers, may have mild or no symptoms, but can still experience bleeding issues.

Symptoms
- Main symptom: **prolonged bleeding**, often noticed after circumcision in infants.
- Bleeding tendency becomes more visible when the child starts crawling or walking.
- Mild cases may go unnoticed until injury or surgery occurs.
- Internal bleeding can happen anywhere in the body.
- Common signs include:
    - Joint bleeding (pain, swelling)
    - Blood in urine or stool
    - Easy bruising
    - Gastrointestinal or urinary tract bleeding
    - Nosebleeds
    - Prolonged bleeding after cuts, surgery, or dental procedures
    - Spontaneous bleeding without injury

Treatment
- Main approach: **Factor VIII replacement therapy**.
- Involves injecting concentrated Factor VIII into the bloodstream.
- Restores the missing protein to help blood clot normally.

Prophylaxis in Haemophilia
Definition
- **Prophylaxis** is the regular, preventive infusion of clotting factor concentrates to avoid bleeding episodes before they occur, rather than treating them after they happen (on-demand therapy).

Purpose
- Maintains clotting factor levels above the threshold needed to prevent spontaneous bleeding.
- Aims to protect joints, muscles, and organs from long-term damage.
- Enables patients to lead an active, near-normal lifestyle without constant fear of bleeds.

How It Works?

- Involves scheduled intravenous injections of **Factor VIII** (for Haemophilia A) or **Factor IX** (for Haemophilia B).
- Can also use newer non-factor therapies (e.g., subcutaneous injections) that rebalance clotting.
- Typically done 2–3 times per week for Haemophilia A, less often for Haemophilia B due to longer half-life.

Types of Prophylaxis

- **Primary prophylaxis**: Started before the second joint bleed and before age 3, to prevent joint damage from the beginning.
- **Secondary prophylaxis**: Started after a few bleeds but before chronic joint damage sets in.
- **Tertiary prophylaxis**: Started after joint disease is established, to prevent further damage and improve function.

Advantages over On-demand Therapy

- Prevents **joint and muscle damage** from recurrent bleeds.
- Reduces the number of spontaneous bleeds and hospitalisations.
- Improves **mobility, independence, and participation** in school, work, and social life.
- Maintains long-term joint health and delays or avoids disability.
- Reduces overall healthcare costs in the long run by avoiding complications.

Global vs. Indian Scenario

- In developed nations: ~90% of haemophilia patients are on prophylaxis, with near-normal life expectancy.
- In India: On-demand therapy is still most common due to **low awareness, limited resources, and high costs**. Some states have recently introduced prophylaxis for children.

Challenges in Implementation

- High cost of clotting factors or non-factor therapies.
- Need for regular venous access, which can be difficult in children.
- Requires patient and family training for home administration.
- Lack of widespread policy support and diagnostic coverage in low-resource settings.

Long-term Impact

- Significantly improves **quality of life** by reducing pain, disability, and anxiety.
- Encourages physical activity and normal growth in children.
- Minimises long-term complications like chronic arthropathy (joint disease).
- Moves haemophilia care towards the goal of “zero bleeds.”

Source: TheHindu

Groundwater Contamination

Context

India's growing groundwater contamination crisis has become a serious public health concern, with hazardous pollutants being linked to long-term illnesses in multiple states.

Importance of Groundwater

- Meets **85% of rural drinking water** needs and **65% of irrigation** requirements.
- Traditionally considered pure, now increasingly polluted.

How Groundwater Gets Contaminated

- **Excessive Fertiliser Use** – Overuse of chemical fertilisers releases nitrates into aquifers.
- **Septic Tank Leakage** – Poorly maintained or leaking septic systems allow waste infiltration.
- **Industrial Effluents** – Discharge of untreated waste introduces heavy metals like lead, cadmium, and mercury.
- **Sewage Infiltration** – Untreated sewage seeps into groundwater, spreading pathogens.
- **Over-Extraction of Water** – Falling water tables concentrate pollutants and mobilise natural toxins (e.g., arsenic, uranium).
- **Geogenic Sources** – Naturally occurring minerals in certain regions release fluoride, arsenic, and uranium into groundwater.
- **Underground Fuel Leaks** – Petroleum or chemical leaks from storage tanks contaminate local aquifers.

Status of Groundwater Contamination in India *(Based on CGWB 2024 Report)*

- **Geographical Spread** – Contamination reported in **440+ districts** across India.
- **Nitrates** – Unsafe levels in **20%+** of samples; major cause: fertilisers & septic leakage.
- **Fluoride** – Excess in **9%+** of samples; severe in Rajasthan, Andhra Pradesh, Telangana → causes dental & skeletal fluorosis.
- **Arsenic** – High levels in Punjab, Bihar, and Gangetic belt → linked to cancers & neurological damage.
- **Uranium** – >100 ppb in parts of Punjab, Andhra Pradesh, Rajasthan → from phosphate fertilisers & over-extraction.
- **Iron & Heavy Metals** – 13% samples above safe limits; lead, cadmium, mercury traced to industrial discharge.
- **Health Impact Hotspots** –
    - *Baghpat, UP*: Kidney failures linked to industrial effluents.
    - *Jalaun, UP*: Petroleum-like contamination from suspected fuel leaks.
    - *Paikarapur, Odisha*: Mass illness from sewage-contaminated groundwater.

Source: TheHindu

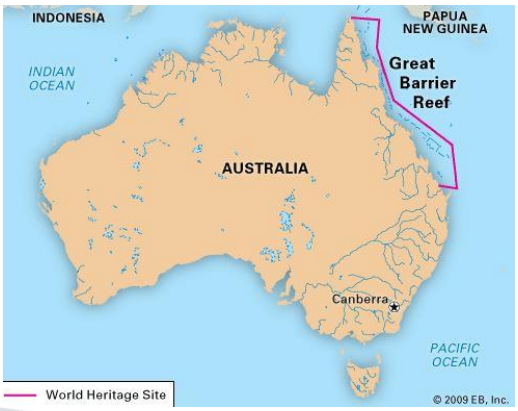
Great Barrier Reef

Context

The **Great Barrier Reef has seen its sharpest drop** in hard coral cover in **nearly 40 years**, driven by climate change-induced heat stress, cyclones, and coral-eating starfish outbreaks.

Great Barrier Reef

- Located in the **Coral Sea**, off the northeastern coast of Australia (Pacific Ocean).
- Longest and largest reef complex in the world; also the largest living structure on Earth.
- Extends **~2,000 km** in a northwest–southeast direction.
- Declared a **UNESCO World Heritage Site** in 1981.
- Managed by the **Great Barrier Reef Marine Park Authority**.



Other Important Geographical Features of Australia

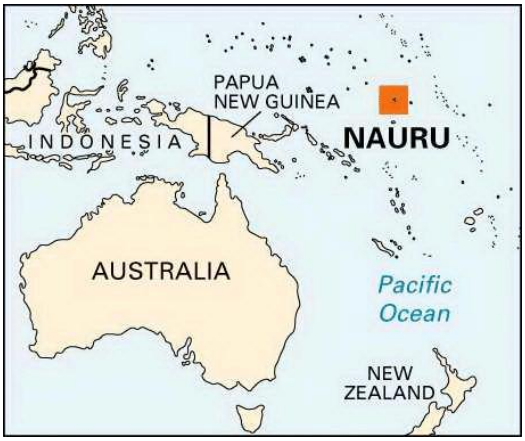
- **Uluru (Ayers Rock) –** Iconic sandstone monolith in Northern Territory.
- **Great Dividing Range** – Longest mountain range in Australia, along the east coast.
- **Murray-Darling Basin** – Largest river system in the country.
- **Simpson Desert** – Famous for red sand dunes.
- **Tasman Sea** – Separates Australia and New Zealand.
- **Coral Sea** – Home to the Great Barrier Reef.
- **Nullarbor Plain** – Vast limestone plateau with the world's longest straight railway track.
- **Kimberley Region** – Rugged, remote northwestern area with dramatic gorges and waterfalls.
- **Great Victoria Desert** – Largest desert in Australia.
- **Cape York Peninsula** – Tropical wilderness in far north Queensland.

Source: TheHindu

Nauru

Context

Nauru has sold its first passports under a new **"climate resilience citizenship"** programme to raise funds for climate action.



About Nauru

- **Location & Region**: Island nation and microstate in Oceania, located in the southwestern Pacific Ocean.
    - Smallest republic in the world

Source: TheHindu

PAHAL (Pratyaksh Hanstantrit Labh) – Direct Benefit Transfer of LPG Scheme

Context

The Indian government has deactivated more than 4 crore duplicate or inactive domestic LPG connections under its PAHAL scheme.

About the Scheme

- **Launch:** Implemented nationwide on January 1, 2015.
- **Ministry**: Ministry of Petroleum & Natural Gas.
- **Purpose**: Transfers LPG subsidies **directly** to consumers' bank accounts to ensure **transparency**, prevent diversion, and reduce leakages.
- **Recognition**: Listed in the **Guinness Book of World Records** as the world's largest cash transfer scheme.
- **Features**:
    - Works for both **Aadhaar-linked** and **non-Aadhaar-linked** accounts.
    - Empowers users with subsidy self-selection.
    - Improves delivery and protects consumer entitlements.
    - Prevents fraud and ensures efficient subsidy management.
- **Eligibility:**
    - Applicant must be an **LPG user**.
    - Combined taxable income of the applicant and spouse must **not exceed ₹10,00,000** in the previous financial year (as per the Income Tax Act, 1961).
- **Benefits**
    - **Direct Subsidy Transfer** – Automatic credit of subsidy to the beneficiary's bank account.
    - **Improved Availability** – Better access to new LPG connections for genuine consumers.
    - **Health Benefits** – Reduces dependence on unclean cooking fuels, lowering indoor pollution and related respiratory issues, especially for women and children in rural areas.

Source: CNBC

News in Short

BharatGen AI

News? BharatGen will cover all 22 scheduled Indian languages by June 2026 as informed by Lok Sabha.

About it

- **Launch**: Officially debuted around **June 2025** during the BharatGen Summit.
- India's first indigenously developed, government-funded multimodal Large Language Model (LLM).
- It's designed to process and generate in **text, speech, and image modalities**, specifically tailored for **India's linguistic and cultural diversity.**
- **Key infrastructure:** Bharat Data Sagar—a multilingual dataset repository.
- The initiative is spearheaded under the **Department of Science & Technology (DST)**'s **National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)**, with research and execution led by the **TIH Foundation for IoT and IoE at IIT Bombay**, supported by a consortium of IITs, IIMs, and IIITs
- **Current language support**: 9 Indian languages including Hindi, Marathi, Tamil, Malayalam, Bengali, Punjabi, Gujarati, Telugu, and Kannada.

Source: Business Today

Smithophis leptofasciatus

News? A team of researchers from Mizoram University have discovered a new species of rain snake named Smithophis leptofasciatus (**Ruahrul** in Mizo).

About it

- **Key Features:**
  - A glossy black body adorned with **narrow, incomplete creamish-white or yellowish-lime transverse bands**
  - Nocturnal and semi-aquatic lifestyle.
  - **3rd *Smithophis* species** described from Mizoram (besides *S. atemporalis* and *S. mizoramensis*).
  - Sightings near flowing water and leaf litter.

Source: TOI

Editorial Summary

Is Indian Economy Perfectly Balanced?

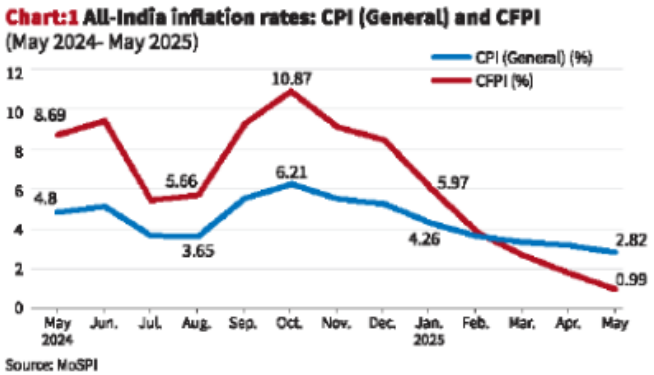
Context

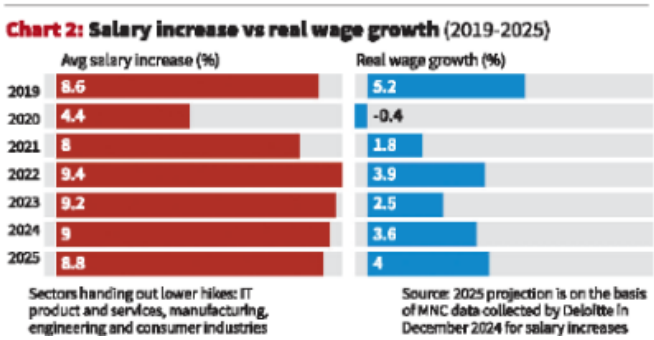
- A few weeks back, India's Finance Ministry declared the Indian economy to be in a "Goldilocks situation".
    - More astute observers of the Indian economy with historical data, question this so-called golden equilibrium which disguises underlying structural imbalances.

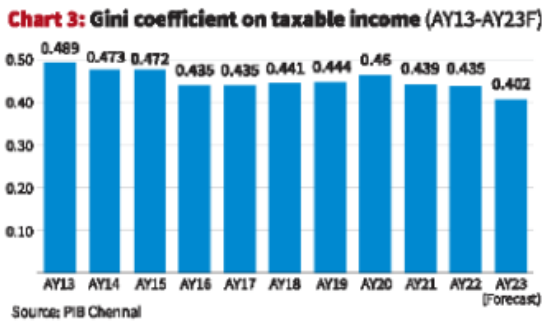
What is meant by a "Goldilocks Situation" in economics?

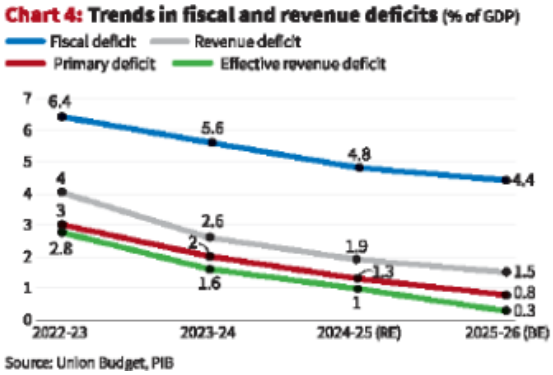
- It typically features:
    - **Moderate, sustainable growth**
    - **Low and stable inflation**
    - **Supportive monetary conditions** that don't stifle business or consumer spending

Why did the government claim India is in a Goldilocks situation?









The Finance Ministry pointed to:

- **High GDP growth**: 7.6% in FY2024 — among the fastest globally.
- **Low headline CPI inflation**: Down to 2.82% in May 2025, within RBI's target range.
- **Peaking interest rates**: Monetary conditions expected to ease, aiding investment.
- **Stable corporate earnings**: Indicating strong business performance.
- Recognition of **India's $3.6 trillion economy** with resilient macro fundamentals.

Arguments against the "Goldilocks" claim

- **Volatile food inflation hurting households:** Food inflation (Consumer Food Price Index (CFPI)) has often been **much higher than general Consumer Price Index (CPI),** e.g., 10.87% in Oct 2024 vs CPI 6.21%.

    - Food forms nearly **50% of average household spending**, so this erodes real purchasing power despite low overall CPI.
- **Stagnant real wage growth:** Nominal salary hikes are offset by inflation — e.g., 9.2% rise in 2023 gave only **2.5% real growth**.
    - Some years even saw **negative real wage growth**.
    - Disproportionately affects lower and middle-income groups, curbing consumption demand.
- **Persistent income inequality:** Gini coefficient improving on paper, but mostly reflects formal taxable income — **informal sector realities are worse**.
    - Post-pandemic recovery is **K-shaped** — wealthy prosper, poorer households lag.
- **Fiscal constraints:** Fiscal deficit still high (projected 4.4% in 2025-26) with **public debt-to-GDP ~81%**.
    - High borrowing risks crowding out private investment and limits social sector spending

Way Forward

- **Tame food inflation volatility:** Strengthen supply chains, buffer stocks, and crop diversification.
    - Better weather risk management.
- **Boost real wage growth:** Support labour-intensive manufacturing.
    - Incentivise MSME growth and skill development.
- **Address inequality:** Expand social protection nets.
    - Invest in universal quality healthcare and education.
- **Ensure fiscal sustainability:** Gradually reduce deficit without cutting essential spending.
    - Broaden tax base and improve compliance.
- **Promote inclusive growth:** Focus on rural infrastructure and job creation in smaller towns.
    - Encourage women's participation in the workforce.

Source: The Hindu