

# FWD

FORTUNE WEEKLY DIGEST



› Artificial Intelligence

› Union Budget 2025-26

› Economic Survey 2024-25

27<sup>th</sup> JANUARY, 2025 - 02<sup>nd</sup> FEBRUARY, 2025

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## 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 gauge 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.

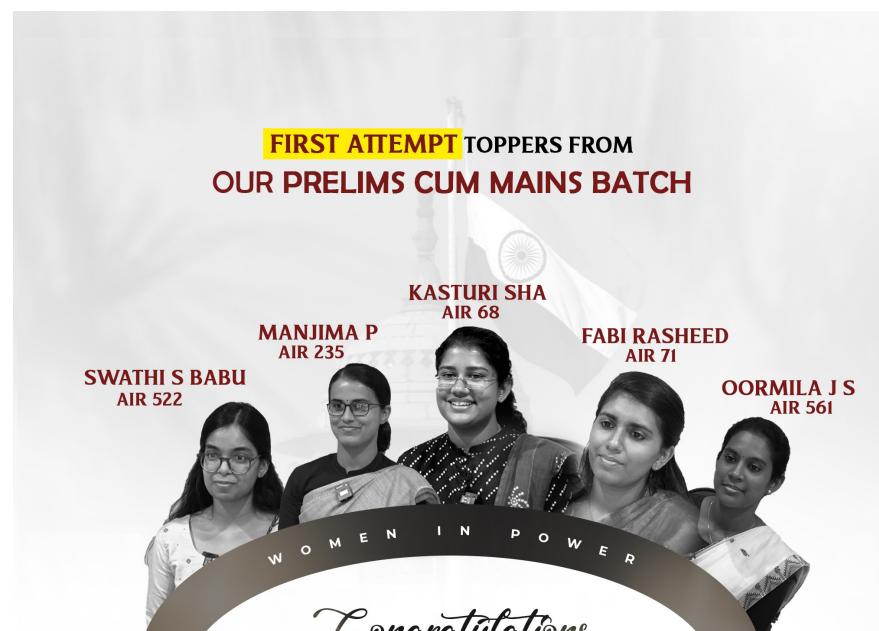
This magazine is a work in progress and your feedback will be appreciated.

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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**FIRST ATTEMPT TOPPERS FROM  
OUR PRELIMS CUM MAINS BATCH**



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# ECONOMIC SURVEY 2024-25

## Syllabus: GS III - Economy

The **Economic Survey**, prepared by the **Department of Economic Affairs (Ministry of Finance)**, provides a **detailed assessment of India's economic performance** for the previous financial year. It analyzes key economic trends and sectoral statistics, including:

- **GDP Growth:** Indicates **overall economic production and financial health**.
- **Inflation Rates:** Tracks **changes in the cost of goods and services**, impacting **purchasing power**.
- **Employment Trends:** Monitors **unemployment, labor market conditions, and job creation**.
- **Fiscal Deficit:** Evaluates the **gap between government revenue and expenditure**.

Beyond key economic indicators, the **Economic Survey** also examines **social and infrastructure progress** along with **global economic influences**.

It is divided into **two sections**:

- **Part A:** Covers **macroeconomic trends, fiscal developments, and sectoral performance**.
- **Part B:** Focuses on **socio-economic challenges** like **poverty, healthcare, education, environment, and financial outlooks**, including **trade balance and foreign exchange reserves**.

More than an assessment, the survey serves as a **policy roadmap**, offering **recommendations for economic challenges and sustainable growth**. Its insights play a crucial role in shaping the **Union Budget** that follows its release.

### Economic Survey 2025: Timing, Access, and Importance

- The **Economic Survey 2025** will be presented on

**January 31, 2025**, a day before the **Union Budget**. **Finance Minister Nirmala Sitharaman** will present it in the **Lok Sabha at 12 PM**, followed by the **Rajya Sabha at 2 PM**.

- **History of the Economic Survey**
  - o The **first Economic Survey** was introduced in **1950-51** as part of the **Union Budget documents**. In **1964**, it was **separated from the Budget** and has since been presented **independently**, usually **one day before the Union Budget** during the **Budget Session of Parliament**.
- **Why is the Economic Survey Presented Before the Union Budget?**
  - o **Provides Economic Context:**
    - It offers a **comprehensive assessment** of the country's **economic performance**, ensuring **budgetary decisions** are based on **current financial realities**.
  - o **Identifies Key Challenges:**
    - Highlights **trends in GDP growth, inflation, employment, fiscal deficit**, and other **economic indicators** to aid policy formulation.
  - o **Enhances Policy Discussions:**
    - **Lawmakers, economists, and industry stakeholders** receive the survey in advance, allowing **well-informed debates** and **refined budget planning** before finalizing allocations.
- By offering a **detailed economic outlook**, the **Economic Survey** serves as a **critical guide for policy decisions** and the **budget-making process**.

## PREFACE

The Economic Survey 2024-25, authored by Chief Economic Advisor V. Anantha Nageswaran, highlights deregulation as a crucial factor in driving domestic growth and economic resilience. It underscores deregulation as a means to lower business costs, foster innovation, and generate employment opportunities.

## CHAPTER 1: STATE OF THE ECONOMY: GETTING BACK TO THE FAST LANE

The global economy grew by **3.3% in 2023**, slightly exceeding the **IMF's projection of 3.2% growth** for the next five years. Growth was impacted by a **slowdown in global manufacturing**, particularly in **Europe and parts of Asia**, due to **supply chain disruptions and weak external demand**. However, the **services sector performed better**, helping sustain growth in many economies.

## GLOBAL ECONOMIC SCENARIO

- Inflation rates have steadily declined, nearing central bank targets, though **services inflation remains persistent** while **core goods inflation has fallen sharply**.
- **Global uncertainty has risen**, with Middle East tensions disrupting **Suez Canal trade (15% of global**

**maritime trade).**

- The **Geopolitical Economic Policy Uncertainty Index** increased from **121.7 (2023)** to **133.6 (2024)**, reflecting policy concerns, while the **World Trade Uncertainty Index** rose from **8.5 to 13**, driven by trade tensions and shifting policies in major economies.

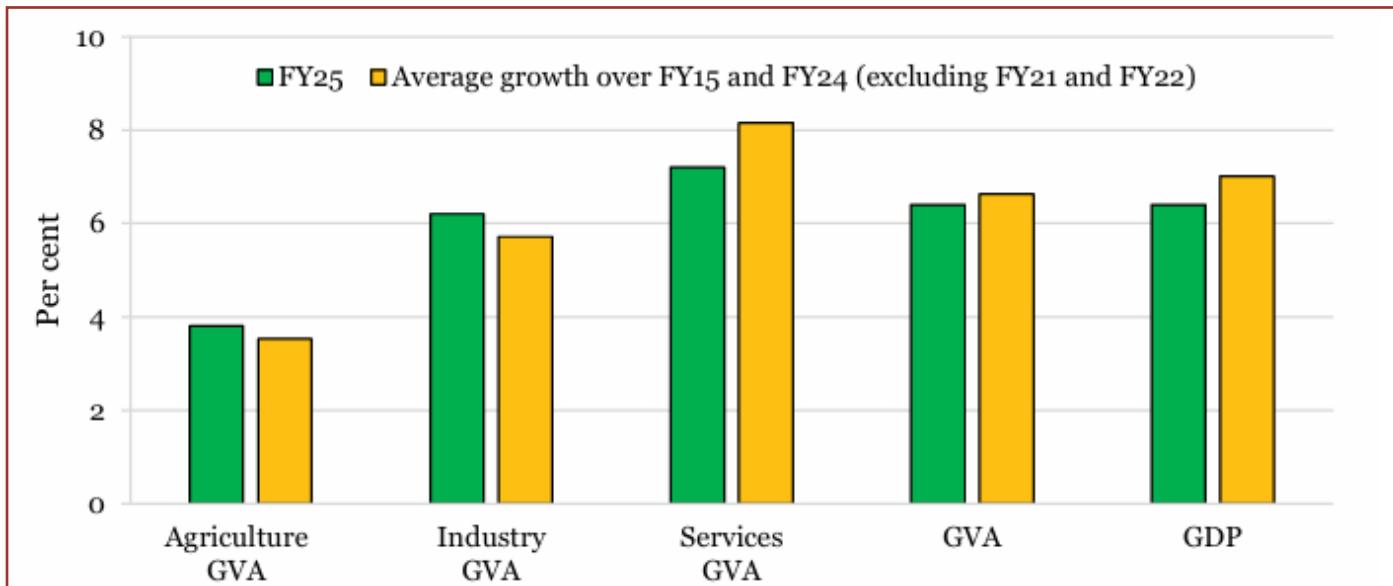
## INDIAN ECONOMY OVERVIEW

India's **real GDP growth** for **FY25** is estimated at **6.4%**, aligning with its **decadal average**.

- **Demand Side: Private final consumption expenditure** is projected to grow by **7.3%**, supported by a **recovery in rural demand**.
- **Supply Side: Real Gross Value Added (GVA)** is expected to expand by **6.4%**.

## SECTORAL PERFORMANCE

- **Agriculture**: Expected to **rebound** with a **3.8% growth** in **FY25**.
- **Industry**: Estimated to grow at **6.2%**, driven by **strong construction activity** and expansion in **electricity, gas, water supply, and utility services**.
- **Services**: Projected to remain **robust at 7.2%**, led by **finance, real estate, professional services, public administration, and defence**.
- Despite challenges, India maintains the fastest growth in the **manufacturing Purchasing Managers' Index (PMI)**.
  - Services PMI remained expansionary in the first half of FY25, driven by new orders, higher output, improved sales, and increased employment.
- **Inflation**: Retail inflation (CPI) declined from **5.4%** in FY24 to **4.9%** (April–December 2024).
- **Capital Expenditure (CAPEX)** has shown continuous growth from FY21 to FY24.
  - Post general elections, **CAPEX grew 8.2% YoY** (July–November 2024).
- **External Sector**
  - India ranks seventh in global services exports, highlighting its competitiveness.
  - Non-petroleum, non-gems & jewellery exports grew 9.1% (April–December 2024), showcasing resilience amid global volatility.
- **Employment Trends**
  - Unemployment rate (age 15+) declined from 6% (2017-18) to 3.2% (2023-24) (**Periodic Labour Force Survey report**).
  - **Formal sector expansion**: Net EPFO subscriptions increased from 61 lakh (FY19) to 131 lakh (FY24), reflecting a rise in formal employment.



(Despite global uncertainty, India's growth remains close to decadal average (at constant prices, MoSPI)

## CHAPTER 2: MONETARY AND FINANCIAL SECTOR DEVELOPMENTS: THE CART AND THE HORSE

Bank credit has grown steadily in the current financial year, aligning closely with deposit growth. Scheduled Commercial Banks (SCBs) have shown consistent profitability improvements, driven by a decline in gross non-performing assets (GNPAs) and a rise in the capital-to-risk weighted asset ratio (CRAR).

### BANKING SECTOR PERFORMANCES & CREDIT AVAILABILITY

- ⌚ **Credit growth** has outpaced **nominal GDP growth** for two consecutive years, with the **credit-GDP gap** narrowing from **(-10.3% in Q1 FY23 to (-0.3% in Q1 FY25)**.
- ⌚ **Asset quality has improved**, as **Scheduled Commercial Banks (SCBs)** reduced **gross non-performing assets (GNPAs)** to **2.6%** by **September 2024**.
- ⌚ The **Capital to Risk-Weighted Assets Ratio (CRAR)** stood at **16.7%**, with all banks meeting the **CET-1** requirement of **8%**.
- ⌚ **India's bank credit-to-GDP ratio** remains lower than **Advanced Economies (AEs)** like the **US, UK, and Japan**, but higher than **Indonesia and Mexico** among **Emerging Market Economies (EMEs)**.
- ⌚ **Regional Rural Banks (RRBs)** expanded significantly, increasing branches from **14,494 (2006) to 21,856 (2023)**.
- ⌚ **Financial inclusion** improved, with the **RBI's Financial Inclusion Index** rising from **53.9 (March 2021) to 64.2 (March 2024)**.

### CAPITAL MARKET PERFORMANCE

India's **primary markets (equity and debt)** mobilized **Rs. 11.1 lakh crore (Apr-Dec 2024)**, 5% higher than FY24. Demat accounts grew **33% YoY**, reaching **18.5 crore** by December 2024.

### DEVELOPMENTS IN INSURANCE, PENSION, CYBERSECURITY, AND INSOLVENCY

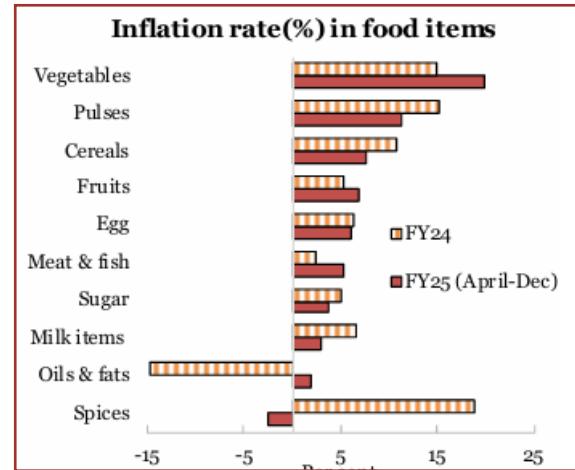
- ⌚ **India's total insurance premium** grew **7.7% in FY24** to **Rs. 11.2 lakh crore**, while **insurance penetration** declined from **4% (FY23) to 3.7% (FY24)**.
  - ⌚ **Life insurance penetration** dropped slightly to **2.8%**, while **non-life insurance remained stable at 1%**.
  - ⌚ In the **pension sector**, total **subscribers reached 783.4 lakh (Sept 2024)**, reflecting **16% YoY growth**.
  - ⌚ However, India's **Mercer CFA Pension Index** declined from **45.9 (2023) to 44 (2024)**.
- ⌚ **Cybersecurity threats** remain **high**, with **one-fifth** of reported **cyber incidents** targeting **financial institutions**, especially **banks**.
  - ⌚ The **IMF Global Financial Stability Report** highlighted that **cyberattack-related financial losses** have **quadrupled since 2017**, reaching **\$2.5 billion**.
  - ⌚ Under the **Insolvency and Bankruptcy Code (IBC)**, **Rs. 3.6 lakh crore** has been realized from **1,068 resolution plans (till Sept 2024)**, amounting to **161% of liquidation value** and **86.1% of fair asset value**.

## CHAPTER 3: EXTERNAL SECTOR: GETTING FDI RIGHT

- ♣ **India's external sector** remained **resilient**, with **total exports (merchandise + services)** rising by **6%** to **USD 602.6 billion**, while **imports** grew by **6.9%** to **USD 682.2 billion**, reflecting **strong domestic demand**.
- ♣ **Global trade** faced **disruptions** due to **rising trade policy uncertainty** and logistical challenges, including **shipping delays in the Red Sea and Panama Canal drought**, leading to **higher costs and extended delivery times**.
  - ⌚ A growing trend toward **friend-shoring and near-shoring** was observed, as countries **focused trade within geopolitical alliances**.
- ♣ **Friendshoring and nearshoring** are strategies for managing global supply chains. Friendshoring involves sourcing from countries that are considered political and economic allies. Nearshoring involves moving production or sourcing to a nearby country.
- ♣ **Foreign Portfolio Investments (FPIs)** remained **volatile** amid global uncertainties, but India's **strong economic fundamentals** ensured **positive inflows**.
- ♣ **Foreign exchange reserves** stood at **USD 640.3 billion (Dec 2024)**, covering **90% of external debt (USD 711.8 billion as of Sep 2024)**, reinforcing macroeconomic stability and resilience.

## CHAPTER 4: PRICE AND INFLATION: UNDERSTANDING THE DYNAMICS

- Global inflation peaked at **8.7% in 2022** due to **supply chain disruptions**, but fell to **5.7% in 2024** following **monetary tightening**.
- India's retail inflation eased from **5.4% (FY24)** to **4.9% (FY25)**, though **food inflation rose to 8.4%**, driven by **vegetables (tomatoes, onions)** and **pulses**, despite stabilization efforts.
- Supply chain and weather disruptions kept **CPI volatility high**, while **core inflation hit a 10-year low** due to falling **service and fuel prices**.
- The **RBI revised FY25 inflation from 4.5% to 4.8%**, expecting **4.2% in FY26**, while the **IMF projects 4.4% (FY25) and 4.1% (FY26)**, assuming stable conditions.



## ENSURING LONG TERM PRICE STABILITY

- Developing **climate-resilient crop varieties** can enhance **yields and reduce crop damage**, ensuring stable food prices.
- Training farmers in best practices and promoting **high-yield, disease-resistant seeds** for key crops like **pulses, tomatoes, and onions** will improve productivity.
- Additionally, implementing **robust data collection and analysis systems** across government levels can help **monitor prices, stocks, storage, and processing facilities**, enabling informed policy decisions to maintain price stability.

## CHAPTER 5: MEDIUM TERM OUTLOOK: DEREGULATION DRIVES GROWTH

- India needs an **8% growth rate** at **constant prices** for the next **one to two decades** to achieve its **Viksit Bharat 2047** goal.
- The **IMF's World Economic Outlook** projects India to become a **USD 5 trillion economy by FY28** and reach **USD 6.3 trillion by FY30**.
- However, India's **medium-term growth** must be assessed within the evolving **global landscape**, including **geo-economic fragmentation, China's manufacturing dominance, and the reliance on China for energy transition efforts**.

## DEREGULATION AND ECONOMIC FREEDOM: A CATALYST FOR GROWTH

- States can drive **systematic deregulation** through a **three-step process**:
  - Identify key areas for **deregulation** under **Ease of Doing Business (EoDB) 2.0** and support **SME growth**.
  - Compare regulations with **other states and countries** to adopt best practices.
  - Assess the **cost impact** of regulations on individual enterprises to enhance efficiency.

## CHAPTER 6: INVESTMENT AND INFRASTRUCTURE: KEEPING IT GOING

Capital expenditure (Capex) has grown at a **38.8% Compounded Annual Growth Rate (CAGR)** from FY20 to FY24. To drive infrastructure development, the government has introduced key initiatives such as the **National Infrastructure Pipeline** and the **National Monetisation Pipeline**, aimed at enhancing investment and asset utilization across various sectors.

### Transport & Connectivity

- Railways:** **2031 km** of railway network commissioned (Apr–Nov 2024), **17 new Vande Bharat trains** introduced.
  - 91 Gati shakti multimodal Cargo Terminal commissioned.
  - Indian Railways targets 30 GW of renewable energy by 2029-30.
- Highways:**
  - Bharatmala Project, which was launched in October 2017 and aims to develop 34,800 km of National Highways, has achieved around 76

percent completion with the construction of 18,926 km of NH.

- Multi-Modal Logistics Parks (MMLP): Till December 2024, Six MMLPs in Chennai, Indore, Nagpur, Jalna, Jogighopa and Bangalore have been awarded.

- **Air Connectivity:** 619 UDAN air routes operational under the **Regional Connectivity Scheme**.

- **Ports:** Expansion under **Sagarmala**, including projects like **Vadhavan Mega Port**.

#### 💡 Energy & Digital Expansion

- **Total installed power capacity:** 456.7 GW, with renewables contributing 209.4 GW (47%).

- **5G coverage:** Expanded to 779 districts.

- **BharatNet:** Fiber connectivity extended to 2.14 lakh Gram Panchayats.

#### 💡 Rural & Urban Development

- **Housing:** 1.18 crore houses sanctioned under **Pradhan Mantri Awas Yojana (PMAY)**.

- **Water Supply:** Jal Jeevan Mission reached 15.3 crore households (79.1%).

- **Electrification:** 18,374 villages electrified, 2.9 crore households connected under **Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)** and **SAUBHAGYA**.

- **Sanitation:** 1.92 lakh villages declared **ODF Plus** in 2024, totaling 3.64 lakh ODF Plus villages.

#### 💡 Space & Strategic Advancements

- **India operates 56 active space assets**.

- **Space Vision 2047** targets major missions, including **Gaganyaan** and **Chandrayaan-4**.

#### 💡 Tourism Sector: Status & Initiatives

- **PRASHAD Scheme:** Enhancing tourism infrastructure at pilgrimage and heritage sites; 26 out of 48 projects completed (Dec 2024).

- **Swadesh Darshan 2.0 (2022):** Promoting sustainable tourism; 75 out of 76 projects completed (Dec 2024).

## ENHANCING INFRASTRUCTURE INVESTMENT FOR SUSTAINED GROWTH

- Accelerating **multi-modal transport modernization** and upgrading existing assets will improve **efficiency and last-mile connectivity**.
- Increasing **private sector participation** in **planning, financing, construction, maintenance, and monetization** of critical infrastructure will further drive sustainable growth.

## CHAPTER 7: INDUSTRY

- ◆ The **industrial sector** is projected to expand by **6.2% in FY25** (first advance estimates), driven by **strong growth in electricity and construction**.
  - The government is actively promoting **Smart Manufacturing and Industry 4.0**, supporting the development of **SAMARTH Udyog centres**.
- ◆ Key industries have witnessed significant progress, with **steel production rising by 3.3% (Apr–Nov FY25)** and **electronics output reaching Rs. 9.52 lakh crore**. Notably, **99% of smartphones are now manufactured**

- domestically, reducing import dependency.
- ◆ According to the **WIPO Report 2022**, India ranks **sixth globally in patent filings**, with **resident applications surpassing 55.2% for the first time**.
- ◆ The **MSME sector**, employing **23.24 crore people**, has seen **2.39 crore businesses formalized under Udyam Assist**.
  - To boost MSME growth, the government launched the **Self-Reliant India Fund**, facilitating **equity funding for scalable enterprises**.

## STATE-WISE INDUSTRIAL PRODUCTION

Gujarat, Maharashtra, Karnataka, and Tamil Nadu contribute **43%** of India's industrial output, while the **Northeast** accounts for only **0.7%**.

## WAY FORWARD

To become a **global manufacturing hub**, India must ensure **collaboration among government, industry, academia, research, and financial sectors**, alongside **skill development initiatives**.

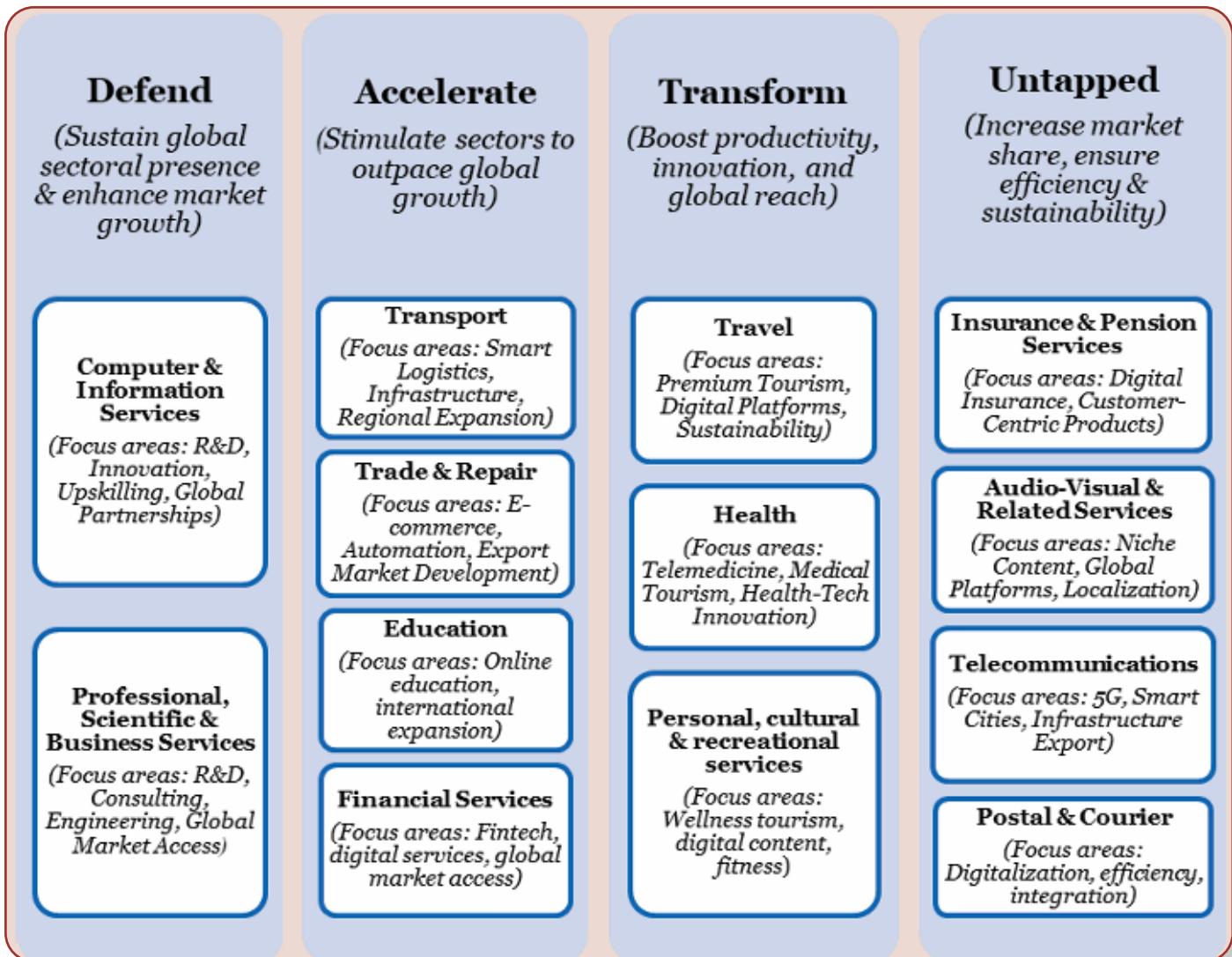
## CHAPTER 8: SERVICES

- India's services sector contributes **55% to Gross Value Added (GVA) in FY25** (up from **50.6% in FY14**) and employs **30% of the workforce**, driving manufacturing growth through servification.
- The country ranks **7th in global services exports (4.3% share)**. Information and computer-related services expanded at **12.8% CAGR (FY13–FY23)**, increasing their GVA share from **6.3% to 10.9%**.
- Railway passenger traffic rose **8%**, while freight movement grew **5.2% (FY24)**. Tourism rebounded, contributing **5% to GDP (FY23)**, and real estate sales reached an **11-year high (H1 FY25)**.
- With **1.18 billion subscribers**, India's **telecom sector** leads in **global mobile data consumption**.

### STATE-WISE SERVICE SECTOR PERFORMANCE

The services sector contributes **55% to India's GVA (FY25)**, with **Karnataka and Maharashtra** alone generating over **25% of GSVA (FY23)**, while **19 states** collectively contribute just **25%**.

### SUMMARY OF STRATEGIC RECOMMENDATIONS



### WAY FORWARD

To sustain growth, **skilling in AI-driven digital and technical sectors** is essential. **Simplifying regulations** will strengthen both **manufacturing and services**, enhancing resilience to global challenges.

## CHAPTER 9: AGRICULTURE AND FOOD MANAGEMENT

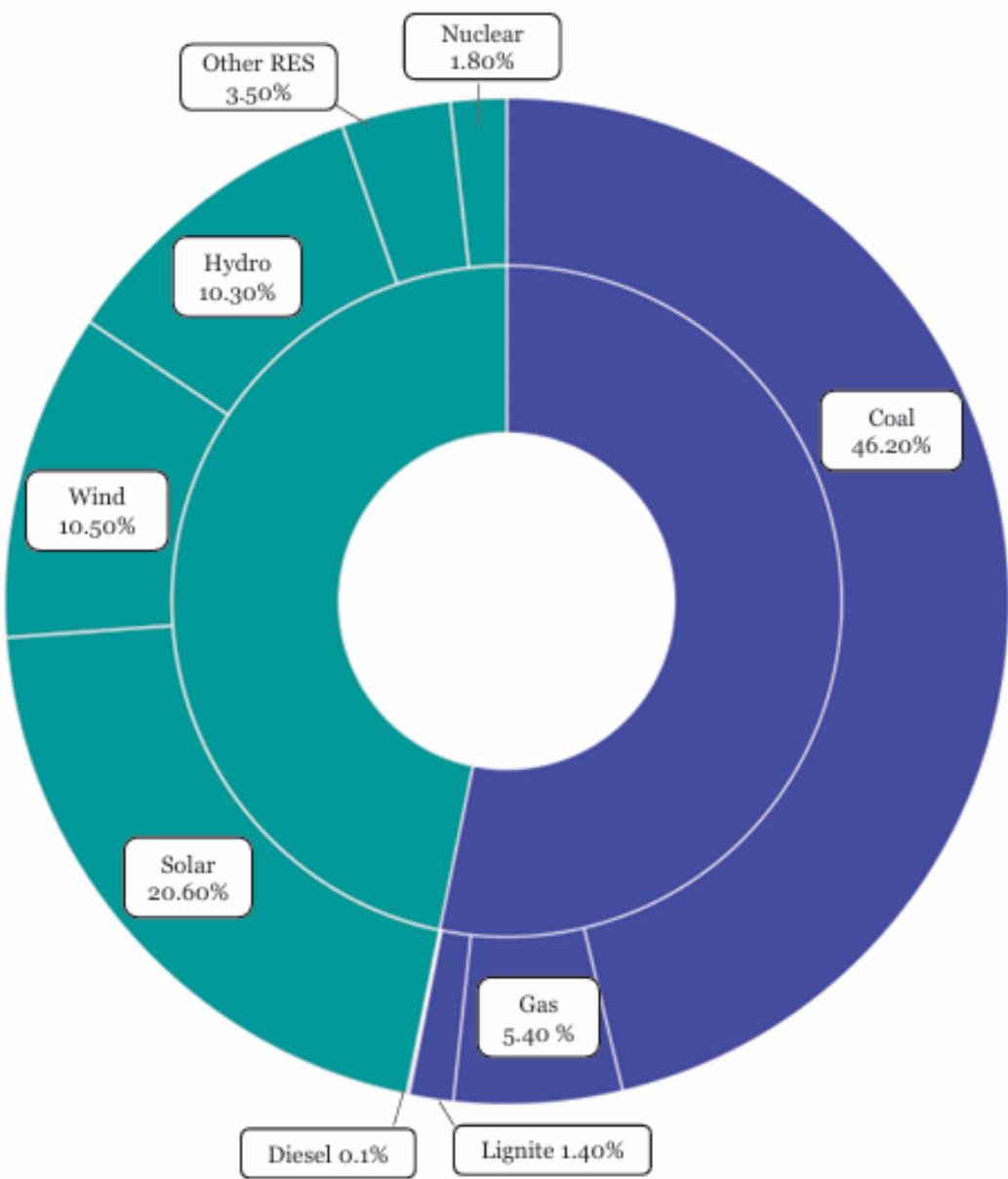
- ◆ The **agriculture sector** contributes **16% to GDP (FY24)** and employs **46.1% of the population**, growing at **5% annually (FY17–FY23)**.
- **Kharif foodgrain production** rose to **1,647 LMT (2024)**, up **89.37 LMT YoY**, while **fisheries (184 LMT) and livestock (CAGR 12.99%)** outpaced traditional farming.
- To support farmers, **Minimum Support Prices (MSP) for Arhar and Bajra** increased by **59% and 77% (FY25)**. Irrigation covers **55% of net sown area**, but **two-thirds of farmland remains drought-prone**.
- The **Kisan Credit Card (KCC) scheme** has **7.75 crore accounts**, while **PM Fasal Bima Yojana** insures **4 crore farmers** over **600 LMT hectares (FY24)**.
- ◆ The **e-NAM platform** connects **1.78 crore farmers and 2.62 lakh traders (Oct 2024)** for better price discovery.
- ◆ **Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY)** provides **free food grains to 80 crore people**, ensuring food security.
- ◆ **Climate action in agriculture**
  - Studies have indicated that a potential 2°C rise in annual temperature and a 7 % increase in annual rainfall by 2099 could lead to an 8-12 % decline in Indian agricultural productivity.
- **Key Interventions:** National Mission for Sustainable Agriculture, Paramparagat Krishi Vikas Yojana (PKVY), Mission Organic Value Chain Development for North Eastern Region (MOVCDNER).
- ◆ **Food Processing & Food Security**
  - **Food processing exports** reached **USD 46.44 billion (FY24)**, contributing **23.4% to agri-food exports** and **11.7% to total exports**.
    - The **food processing industry** accounts for **12.41% of organized sector employment** and contributes **11.7% to total exports (FY24)**. The **share of processed food exports** in agri-food exports increased from **14.9% (FY18) to 23.4% (FY24)**.
    - Major initiatives include **PM Kisan Sampada Yojana (PMKSY)**, **PLI Scheme for Food Processing (PLISFPI)**, and **PM Formalisation of Micro Food Processing Enterprises (PMFME)**.
  - For **food security**, key programs like the **National Food Security Act (NFSA)** and **Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY)** ensure grain distribution, while the **Credit Guarantee Scheme for e-NWR** supports **post-harvest financing** for farmers.

## CHAPTER 10: CLIMATE AND ENVIRONMENT: ADAPTATION MATTERS

Climate adaptation spending increased from **3.7% to 5.6% of GDP (FY16–FY22)**. The **LiFE (Lifestyle for the Environment) initiative** promotes sustainability, with potential **global savings of USD 440 billion by 2030** through lower consumption and reduced costs.

- ✳ **Renewable Energy & Emissions**
  - **Non-fossil power capacity** stands at **46.8%**, with a target of **50% by 2030**.
  - **Forest carbon sink** grew by **2.29 billion tonnes CO<sub>2</sub> (2005–2023)**.
- ✳ **Climate Finance & Global Cooperation**
  - **COP 29** failed to secure sufficient climate funds, with only **USD 300 billion annually** against a required **USD 5.1–6.8 trillion by 2030**.
  - India issued **Rs. 20,000 crore in Sovereign Green Bonds (FY24)** to finance green projects.
- ✳ **Sustainability & Resilience**
  - **MISHTI Initiative** aims to restore **22,560 hectares of mangroves** across **13 states & UTs**.
  - **Water conservation** under **AMRUT 2.0** approved **3,078 water body rejuvenation projects**.
  - **PM Surya Ghar** installed **7 lakh rooftop solar systems**, targeting **1 crore households**.
- ✳ **Energy Security & Transition**
  - **Coal** remains the primary energy source, with **65,290 MW of supercritical plants** enhancing efficiency.
  - **Nuclear, hydrogen, and bioenergy** programs are expanding for a **balanced energy transition**.

## INDIA'S INSTALLED GENERATION CAPACITY (FUEL-WISE) (30 NOVEMBER 2024)



## CHAPTER 11: SOCIAL SECTOR

India's **social sector spending** grew at a **15% CAGR (FY21–FY25)**, reaching **Rs. 25.7 lakh crore** in **FY25**. **Income inequality declined**, with the **Gini coefficient** falling to **0.237 (rural)** and **0.284 (urban)** in **2023-24**.

- 👉 **Education & Skill Development:**
  - Spending rose **12% Compound annual growth rate (CAGR)**, reaching **Rs. 9.2 lakh crore**, reducing **dropout rates** to **1.9% (primary)** and **14.1% (secondary)**.
  - **Higher education enrolment** grew **26.5% (2014–2022)**, pushing the **Gross Enrolment Ratio (GER)** to **28.4%**.
  - **Digital Learning Expansion: SWAYAM, e-VIDYA, and AI-based education tools** are bridging gaps in learning access.
- 👉 **Healthcare & Social Security:** **Healthcare spending** surged **18%** to **Rs. 6.1 lakh crore**, with **Ayushman Bharat (AB PM-JAY)** saving **Rs. 1.25 lakh crore** in medical expenses.
  - Key Initiatives: Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY), Localisation of Sustainable Development Goals (SDGs), Jan Aushadhi scheme etc.
  - Disruptive technology providing seamless and equitable healthcare: U-WIN, E-Sanjeevani, Ayushman Bharat Digital Mission (ABDM),

‘i-DRONE’ (ICMR’s Drone Response and Outreach for North East) etc.

#### → **Rural Infrastructure: Key Developments**

- Under Pradhan Mantri Gram Sadak Yojana (PMGSY) 99.6% of the targeted habitations provided connectivity.
  - Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM-JANMAN), a separate vertical has been launched under PMGSY.
- Housing: 2.69 crore houses built under Pradhan Mantri Awas Yojana-Gramin (PMAY-G) since 2016.
- Water Bodies: 68,843 Amrit Sarovars developed under Mission Amrit Sarovar.
- Drinking Water: 12.2 crore households received tap water connections under Jal Jeevan Mission.

#### → **Localising SDGs**

- Gram Panchayats are implementing SDG localisation through Village Panchayat Development Plans under **Mission Antyodaya and Transformation of Aspirational Districts Programme (TADP)**.

- Social Inclusion & Gender: Gender Resource Centres (GRCs) and Gender Point Persons (GPPs) support gender equality at the local level.

#### → **Enhancing Rural Incomes**

- **Deendayal Antyodaya Yojana-National Rural Livelihood Mission (DAY NRLM)**: 10.05 crore rural households mobilized into 90.90 lakh SHGs, with ₹49,284 crore in capital support. 1.37 lakh SHG women serve as Banking Correspondent Sakhi.
- Farm Livelihoods: 2.64 crore agri-nutri gardens, 4.30 crore Mahila Kisan supported.
  - Non-Farm Livelihoods: Start-Up Village Entrepreneurship Programme (SVEP) facilitated 3.13 lakh enterprises across 280 blocks in 31 States/UTs.
- **Mahatma Gandhi National Rural Employment Guarantee Scheme**: 99.98% wage payments via DBT and Aadhaar-based system, evolving into a durable asset creation program. Integrated with Nutri Gardens (NRLM) and fodder farms (DAHD) for livelihood diversification.

## CHAPTER 12: EMPLOYMENT AND SKILL DEVELOPMENT

💡 India’s **unemployment rate** dropped from **6% (2017-18)** to **3.2% (2023-24)**, with **Female Labour Force Participation Rate (LFPR)** rising to **60.1%**.

- The **working-age population** is projected to reach **923.9 million by 2026**, offering a **demographic dividend**.
- **Female Labour Force Participation Rate (LFPR)** surged from **23.3% to 41.7%**, driven by **rural participation**. **Self-employment** rose to **58.4%**, while **regular wage jobs** remained at **21.7%**.

## GOVERNMENT INITIATIVES TO BOOST FEMALE ENTREPRENEURSHIP

### MINISTRY OF MICRO, SMALL AND MEDIUM ENTERPRISES

 <p><b>Formalisation of Enterprises<sup>31</sup></b></p> <p>63 per cent of the 2.41 crore enterprises formalised since January 2023 are women-owned.</p>	 <p><b>Marketing Support<sup>32</sup></b></p> <p>Women’s trade fair participation is fully subsidised.</p>	 <p><b>PM Employment Guarantee Programme<sup>33</sup></b></p> <p>41 per cent of loans in FY24 were sanctioned to women, with higher subsidies (25–35 per cent) and lower contributions (5 per cent).</p>	 <p><b>Procurement</b></p> <p>3 per cent of procurement by CPSEs is reserved for women-owned enterprises.</p>
 <p><b>Skill Development</b></p> <p>Over 21,600 women trained in coir manufacturing in 5 years; free entrepreneurial training is offered.</p>	 <p><b>ZED Certification<sup>34</sup></b></p> <p>100 per cent subsidy on certification for women MSMEs.</p>	 <p><b>Access to Credit<sup>35</sup></b></p> <p>Women entrepreneurs receive 90 per cent guarantees (vs. 75 per cent for others) and reduced fees under the Credit Guarantee Scheme.</p> <p>Of 97.68 lakh guarantees approved, 22 per cent are for women.</p>	

### MINISTRY OF SKILL DEVELOPMENT AND ENTREPRENEURSHIP

 <p><b>SANKALP<sup>36</sup></b></p> <p>32,262 women (67 per cent of beneficiaries) trained in entrepreneurship between 2021 to 2024.</p>	<b>Department for Promotion of Industry and Internal Trade</b>	
 <p><b>Start-up Support<sup>37</sup></b></p> <p>10 per cent of the Fund of Funds for Start-ups is reserved for women.</p>	 <p><b>Women Entrepreneurship Platform<sup>38</sup></b></p> <p>Launched in 2018 to aggregate and showcase policies, with NSA awards recognizing women-led start-ups.</p>	
<p><b>Ministry of Food Processing Industries</b></p>  <p><b>PM Micro Food Processing Scheme<sup>39</sup></b></p> <p>SHG members receive ₹40,000 seed capital and 50 per cent branding/marketing grants.</p>	<p><b>Ministry of Tribal Affairs</b></p>  <p><b>Adivasi Mahila Sashaktikaran Yojana<sup>40</sup></b></p> <p>Loans up to ₹2 lakh at 4 per cent interest for ST women.</p>	

## MINISTRY OF COOPERATION

 <p><b>NCDC Support<sup>42</sup></b> ₹6,426 crore disbursed for women cooperatives; 25,385 registered cooperatives.</p>	 <p><b>Nandini Sahakar Scheme</b> 2 per cent interest subvention for innovative cooperative projects.</p>	 <p><b>Swayam Shakti Sahakar Yojna</b> Working capital loan to support women SHGs.</p>
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- ♣ **Formal sector jobs** grew, with **Employees' Provident Fund Organisation (EPFO)** payroll additions doubling from 61 lakh (FY19) to 131 lakh (FY24).
- o **Skill India, Mudra Yojana, and Startup India** promoted entrepreneurship, with **73,151 women-led startups**.
- o The **digital economy and renewable energy sectors** are driving job creation, while initiatives like the **PM-Internship Scheme** enhance employment opportunities.
- ♣ **AI & Labour Market:** AI poses both challenges and opportunities, with **75 million jobs at risk (ILO 2024)** and **300 million exposed (Goldman Sachs)**.
- o India's AI market is projected to grow **25-35% CAGR by 2027 (NASSCOM)**, making **upskilling, regulatory oversight, and human-AI collaboration** essential for a balanced transition.

## INDIA'S KEY CHALLENGES AND WAY FORWARD (ECONOMIC SURVEY 2024-25)

### KEY CHALLENGES

Global Risks	<b>Geopolitical conflicts</b> (Russia-Ukraine, Red Sea disruptions) impact <b>trade, energy prices, and supply chains</b> . <b>Trade protectionism and financial volatility</b> threaten exports and capital inflows.
Inflation & Climate Impact	<b>Food inflation remains high</b> , worsened by <b>erratic monsoons and extreme weather</b> , affecting food security and farm incomes.
Investment & Infrastructure	<b>Private investment lags</b> despite <b>public Capex growth (38.8% CAGR, FY20-FY24)</b> . <b>High logistics costs (13-14% of GDP)</b> and <b>urban congestion</b> limit efficiency.
Employment & Skills Gap	<b>Job creation lags behind economic growth</b> , with <b>low female LFPR (41.7%)</b> and skill mismatches.
Fiscal & Financial Risks	<b>State debt burdens, unsecured lending risks (NBFCs &amp; fintech)</b> , and <b>low MSME credit penetration</b> hinder financial stability.
External Sector	<b>FDI inflows grew 17.9% YoY</b> , but <b>high repatriation and IT export dependence (70% of services exports)</b> pose risks.
Climate & Energy Transition	<b>Coal dependency, grid stability issues</b> , and <b>high storage costs</b> slow renewable adoption, while <b>global climate finance remains inadequate</b> .
Ease of Doing Business (EoDB) Gaps	<b>Labour laws, land acquisition hurdles, and tax complexities</b> limit <b>MSME and startup growth</b> . <b>R&amp;D spending (0.64% of GDP)</b> remains low, affecting <b>innovation</b> .
AI Disruptions	AI's <b>unproven reliability</b> raises concerns in <b>hiring, policing, and automation</b> . <b>Energy demand for AI data centers</b> could reach <b>India's total electricity consumption</b> (Bloomberg, 2024).

## WAY FORWARD

Strengthening Trade & Energy Security:	Diversify trade partnerships, invest in <b>strategic petroleum reserves</b> , and expand renewable energy.
Boosting Domestic Investment & Manufacturing	Encourage <b>PLI schemes, 100% FDI in key sectors</b> , and <b>supply chain resilience</b> .
Controlling Inflation	Enhance food storage, logistics, and price monitoring.
Fiscal Stability	Expand <b>GST coverage</b> , digitize tax administration, and <b>rationalize subsidies</b> .
Job Creation & Skilling	Ease <b>MSME regulations</b> , integrate <b>AI &amp; digital skills</b> in vocational training.
Accelerating Energy Transition	Expand <b>solar, wind, and green hydrogen</b> projects while investing in <b>energy storage</b> for grid stability.
Climate Resilience	Strengthen <b>crop insurance, water conservation</b> , and <b>sustainable agriculture</b> .

## CONCLUSION

The **Economic Survey 2024-25** outlines a **roadmap for India's economic growth**, focusing on **deregulation, strategic investments, and a balanced energy transition**. The government aims to **foster an enabling environment**, while businesses are expected to drive **innovation and productivity**. Recognizing the survey as both an **academic study and a policy guide**, continuous **feedback is encouraged** to refine future editions and enhance its relevance in decision-making.

# UNION BUDGET 2025-26

**Syllabus: GS III - Economy**

## GLOSSARY

- **Budget Estimates (BE):** Initial financial projections for the **upcoming fiscal year**, outlining expected revenues and planned expenditures to guide government policies and resource allocation.
- **Revised Estimates (RE):** Mid-year **adjustments** to BE, reflecting actual financial performance and any economic or policy changes, providing a more realistic forecast.
- **Actuals:** Final financial **outcomes** at the end of the fiscal year, showing actual revenues collected and expenditures made, ensuring transparency and aiding future planning.
- **GDP (Gross Domestic Product):** The total monetary value of all goods and services produced within a country in a given year.
- **Fiscal Deficit:** The gap between total government expenditure and its total revenue (excluding borrowings), expressed as a percentage of GDP.
- **Outstanding Liabilities:** The total debt the government owes, expressed as a percentage of GDP.
- **TDS (Tax Deducted at Source):** A tax deducted at the time of income payment.
- **TCS (Tax Collected at Source):** A tax collected by the seller from the buyer at the time of transaction.
- **Basic Customs Duty (BCD):** A tax levied on imported goods.
- **Inverted Duty Structure:** A situation where import duties on raw materials are higher than on finished goods, discouraging domestic manufacturing.

## INTRODUCTION

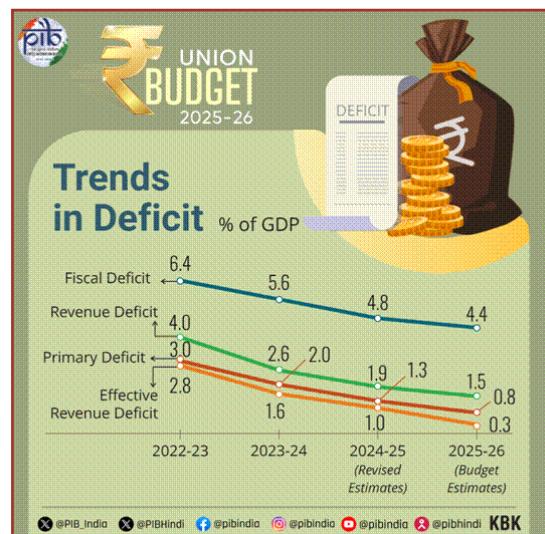
Union Finance Minister Smt. Nirmala Sitharaman presented the Union Budget 2025-26 in Parliament on February 1, 2025, quoting Telugu poet Sri Gurajada Appa Rao's saying, "A country is not just its soil; a country is its people." With the theme "**Sabka Vikas**," the budget focuses on ensuring balanced growth across all regions.

## KEY HIGHLIGHTS

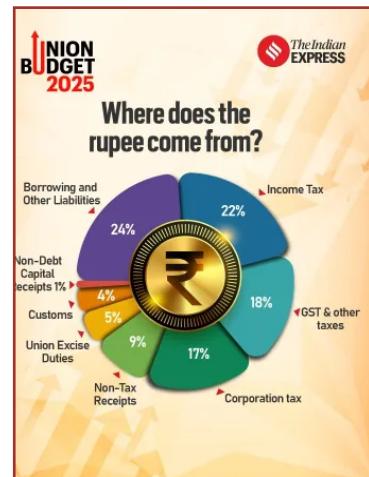
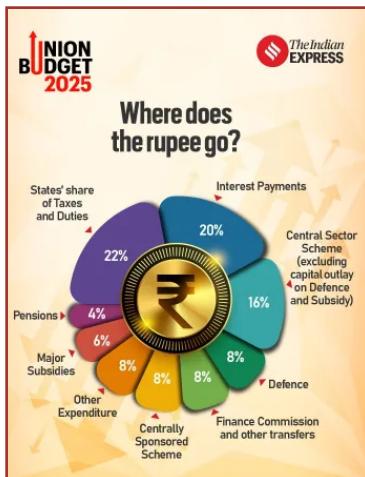
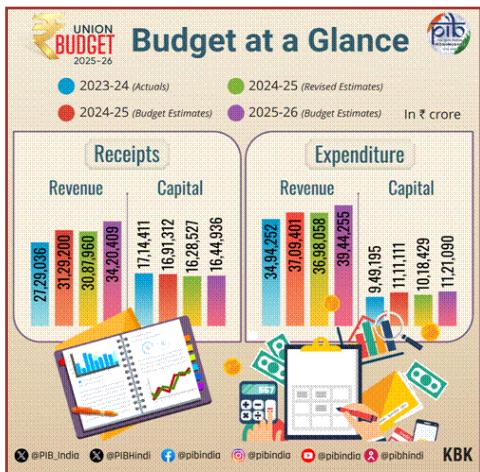
- ➡ **Expenditure:** The government is estimated to spend **Rs 50,65,345 crore** in 2025-26, 7.4% higher than the revised estimate of 2024-25.
  - Interest payments account for 25% of the total expenditure, and 37% of revenue receipts
  - Capital expenditure allocation: **Rs. 11.21 lakh crore** (₹10,000 crore higher than 2024-25).
- ➡ **Receipts:** The receipts (other than borrowings) in 2025-26 are estimated to be **Rs 34,96,409 crore**, about 11.1% higher than the revised estimate of 2024-25.
  - Tax revenue which forms a major part of the receipts is also expected to increase by 11% over the revised estimate for 2024-25.
- ➡ **GDP:** The government has estimated a nominal GDP growth rate of **10.1%** in 2025-26 (i.e., real growth plus inflation).
- ➡ **Deficits:** Revenue deficit in 2025-26 is targeted at 1.5% of GDP. This is lower than the revised estimate of 1.9% in 2024-25.
  - **Fiscal deficit** in 2025-26 is targeted at **4.4% of GDP**, lower than the revised estimate of 4.8% of

GDP in 2024-25.

- ➡ **Debt:** The central government aims to reduce its outstanding liabilities to around 50% of GDP by March 2031. In 2025-26, outstanding liabilities are estimated to be 56.1% of the GDP.



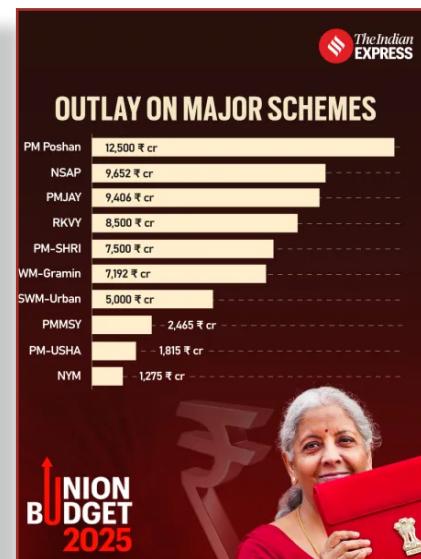
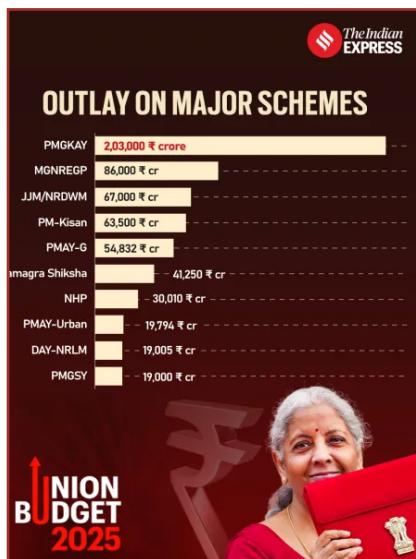
- ➡ The Finance Minister reiterated the commitment to fiscal consolidation, aiming for a declining Central Government debt as a percentage of GDP.



## EXPENDITURE OF MAJOR ITEMS



## ALLOCATION TO MAJOR SCHEMES



## BROAD PRINCIPLES OF VIKSIT BHARAT

- **Zero Poverty** – Committed to eradicating poverty through inclusive development.
- **Quality Education** – Ensuring 100% access to good-quality school education.
- **Affordable Healthcare** – Providing high-quality, accessible, and comprehensive healthcare for all.
- **Skilled Workforce** – Achieving 100% skilled labour with meaningful employment.
- **Women's Economic Participation** – Targeting 70% women's participation in economic activities.
- **Agricultural Growth** – Strengthening farmers to make India the 'food basket of the world'

## ENGINES TO VIKSIT BHARAT

The Union Budget highlights that **Agriculture, MSME, Investment, and Exports** are engines in the journey to Viksit Bharat using reforms as fuel, guided by the spirit of inclusivity.

### 1st Engine: Agriculture

- ➔ **Prime Minister Dhan-Dhaanya Krishi Yojana:** Launched in **100 districts** covering **1.7 crore farmers** to enhance productivity, crop diversification, irrigation, post-harvest storage, and credit access.
- ➔ **Rural Prosperity and Resilience Programme:** A multi-sectoral initiative to address underemployment through skilling, investment, technology, and rural economic growth.
- ➔ **Makhana Board for Bihar:** Bihar will establish a Makhana board to promote cultivation and marketing of fox

nuts, with 85% of India's Makhana production coming from the state.

- Farmers engaged in Makhana cultivation will be organized into Farmer Producer Organizations (FPOs).
- Around 10 lakh people are involved in Makhana cultivation and production in Bihar.
- ➡ **Mission for Aatmanirbharta in Pulses:** A six-year mission focusing on Tur, Urad, and Masoor, with NAFED and NCCF ensuring procurement for the next four years.
- ➡ **Comprehensive Programme for Vegetables & Fruits:** Aimed at boosting horticulture production and value addition.
- ➡ **National Mission on High Yielding Seeds:** A mission will be launched to strengthen research, develop high-yielding, pest-resistant, and climate-resilient seeds, and make over 100 seed varieties commercially available.
- ➡ **Five-Year Mission for Cotton Productivity:** Launched to enhance cotton yield and strengthen the textile value chain.
- ➡ **Kisan Credit Card Loan Limit Increase:** Loan limits raised from ₹3 lakh to ₹5 lakh under the modified interest subvention scheme.
- ➡ **Sustainable Fisheries Framework:** A framework for sustainable fisheries from the Indian Exclusive Economic Zone and High Seas, focusing on Andaman & Nicobar and Lakshadweep Islands.
- ➡ **New Urea Plant at Namrup:** A new urea plant with an annual production capacity of 12.70 lakh tonnes will be set up in Namrup, Assam, as the 7th new urea plant in India since 2019.
  - The six new plants already operational are in Gadepan (Rajasthan), Ramagundam (Telangana), Panagarh (West Bengal), Gorakhpur (Uttar Pradesh), Barauni (Bihar), Sindri (Jharkhand), and Talcher (Odisha).

## 2nd Engine: MSMEs

MSMEs contribute 45% of India's exports, making them crucial for economic development.

- ➡ **Enhanced Investment and Turnover Limits:** Investment and turnover limits for MSMEs will be enhanced to 2.5 and 2 times, respectively, to improve efficiency, technological upgradation, and access to capital.
- ➡ **Credit Guarantee Cover Enhancement:** Measures have been introduced to enhance credit access, including increased guarantee cover for MSME loans.
  - **For Micro and Small Enterprises:** From ₹5 crore to ₹10 crore, leading to additional credit of ₹1.5 lakh crore over the next 5 years.
  - **For Startups:** From ₹10 crore to ₹20 crore, with the guarantee fee reduced to 1% for loans in 27 focus sectors for Atmanirbhar Bharat.
  - **For Well-run Exporter MSMEs:** For term loans up to ₹20 crore.
- ➡ **Customized Credit Cards for Micro Industries:** Customised credit cards with a limit of ₹5 lakh will be issued to micro industries through the Udyam portal, with 10 lakh cards to be issued in the first year.
- ➡ **Fund of Funds for Startups:** A new Fund of Funds for startups will be set up with an additional ₹10,000 crore, expanding its scope.
  - The existing Alternate Investment Funds (AIFs) for startups have received commitments of over ₹91,000 crore, supported by a Government contribution of ₹10,000 crore.
- ➡ **Support for Women, SC, and ST Entrepreneurs:** A new scheme will provide term loans up to ₹2 crore for 5 lakh first-time entrepreneurs from these groups over the next five years.
- ➡ **National Hub for Toys:** A scheme will be launched to make India a global hub for toys, promoting the 'Make in India' brand, building on the National Action Plan for Toys.
- ➡ **National Institute of Food Technology, Entrepreneurship, and Management:** A new institute will be set up in

Bihar as part of the 'Purvodaya' initiative.

- ➡ **National Manufacturing Mission:** The government will launch a National Manufacturing Mission for small, medium, and large enterprises to promote 'Make in India,' providing policy support, execution roadmaps, and governance frameworks.
  - It will support clean tech manufacturing, focusing on solar PV cells, EV batteries, motors and controllers, electrolyzers, wind turbines, high-voltage transmission equipment, and grid-scale batteries

## 3rd Engine: Investment

### Investment in People

- ➡ **Atal Tinkering Labs Expansion:** 50,000 Atal Tinkering Labs will be set up in government schools over the next five years to foster innovation.
- ➡ **Broadband for Schools & Health Centres:** Under BharatNet, all government secondary schools and rural primary health centres will receive broadband connectivity.
- ➡ **Eklavya Model Residential Schools:** Target to make 728 schools functional by March 2026 for 3.5 lakh tribal students.
- ➡ **Bharatiya Bhasha Pustak Scheme:** Digital-format Indian language books will be provided for school and higher education under this initiative.
- ➡ **Skilling Centres of Excellence:** Five national centres will be established with global expertise to equip youth with skills for "Make for India, Make for the World."
- ➡ **AI in Education:** A Centre of Excellence in Artificial Intelligence will be set up with a ₹500 crore allocation to enhance AI-driven learning.
- ➡ **Gig Worker Welfare:** The government will arrange identity cards, e-Shram registration, and PM Jan Arogya Yojana healthcare coverage for gig workers.
- ➡ **IIT Expansion:** Five third generation IITs (Palakkad, Dharwad, Jammu, Bhilai, Tirupati) to add 6,500 seats in five years.
- ➡ **Medical Education:** Additional 10,000 seats in medical colleges and hospitals to be created next year.
- ➡ **Tourism Development Initiatives**
  - Skill development in hospitality, MUDRA loans for homestays, and improved travel connectivity.
  - Special focus on promoting tourism in destinations related to Lord Buddha and medical tourism.
- ➡ **Bihar-Specific Initiatives**
  - **Greenfield Airports:** New greenfield airports to be developed in Bihar, complementing the expansion of Patna airport and development of a brownfield airport at Bihta.
  - **Western Koshi Canal Project:** Financial support for the Western Koshi Canal ERM Project to help farmers in Mithilanchal with irrigation across 50,000 hectares.

### Investment in Economy

- ➡ **Infrastructure Pipeline in PPP Mode:** Infrastructure ministries will announce a three-year project pipeline to boost private investment.
- ➡ **Interest-Free Loans to States:** ₹1.5 lakh crore has been allocated for 50-year interest-free loans to states, with incentives for reforms.
- ➡ **Asset Monetization Plan 2025-30:** The government will reinvest ₹10 lakh crore from asset monetization into new projects.

- ➡ **Jal Jeevan Mission Extension:** The scheme is extended till **2028 to achieve 100% coverage**, focusing on infrastructure quality and community-led rural water supply management.
- ➡ **Urban Challenge Fund:**
  - A **Rs. 1 lakh crore fund** will support city redevelopment, growth hubs, and improved water and sanitation.
  - Covers **up to 25% of viable project costs**, with at least **50% funding from bonds, bank loans, or PPPs**.
  - ₹10,000 crore allocated for 2025-26.
- ➡ **Maritime Development Fund:** ₹25,000 crore Maritime Development Fund established to promote the maritime sector.
- ➡ **SWAMIH Fund 2:** ₹1 lakh crore blended finance facility to complete 1 lakh affordable housing units.
- ➡ **Modified UDAN Scheme:** Enhancing regional connectivity to 120 new destinations and carrying 4 crore passengers over the next 10 years, supporting helipads and smaller airports in hilly, aspirational, and North East regions.

#### Investment in Innovation

- ➡ **Nuclear Energy Mission:** A ₹20,000 crore Nuclear Energy Mission for research and development of Small Modular Reactors (SMR).
- ➡ **National Geospatial Mission:** A mission will be launched to develop foundational geospatial data for urban planning and governance.
- ➡ **Gyan Bharatam Mission:** Over 1 crore manuscripts will be surveyed, documented, and conserved, with a National Digital Repository for knowledge sharing.
- ➡ **Gene Bank:** Establishment of a second Gene Bank with 10 lakh germplasm lines for food security.
- ➡ Deep Tech Fund of Funds for next-generation startups.
- ➡ PM Research Fellowships for technological research in IITs and IISc.

#### 4th Engine: Exports

- ➡ **Export Promotion Mission:** A collaborative initiative by the Ministries of Commerce, MSME, and Finance to help MSMEs access global markets.
- ➡ **BharatTradeNet (BTN):** A proposed digital public infrastructure for seamless trade documentation and financing solutions.
- ➡ **Domestic Manufacturing Support:** Focus on integrating India's economy with global supply chains through capacity-building measures.
- ➡ **Industry 4.0 Incentives:** Government support for the domestic electronic equipment industry to leverage emerging technological opportunities.
- ➡ **Global Capability Centres Framework:** A national framework to promote Global Capability Centres (GCCs) in tier-2 cities.
- ➡ **Air Cargo and Warehousing Infrastructure:** Upgradation initiatives to enhance logistics for high-value and perishable exports.

## FINANCIAL SECTOR REFORMS AND DEVELOPMENT

- ④ **Ease of Doing Business:** Reforms to simplify compliance, expand financial services, and build a robust regulatory framework.
- ④ **India Post Transformation:** India Post and India Post Payments Bank will be repositioned as catalysts for the rural economy, with India Post being transformed into a public logistics organization.
- ④ **FDI in Insurance:** Proposal to raise the Foreign Direct Investment (FDI) limit in insurance from **74% to 100%** for companies investing the entire premium in India
- ④ **Credit Enhancement Facility by NaBFID:** Introduction of a 'Partial Credit Enhancement Facility' for corporate bonds in infrastructure.
- ④ **Grameen Credit Score:** Public Sector Banks to develop a framework for serving rural areas and SHG members.

④ **Proposed Measures:** The Finance Minister proposed four specific measures to develop a modern, flexible, people-friendly, and trust-based regulatory framework for the 21st century.

- o **High-Level Committee for Regulatory Reforms:** To review non-financial sector regulations, enhance ease of doing business, and submit recommendations within a year.
- o **Investment Friendliness Index:** A new index to assess states' investment climate, promoting competitive cooperative federalism.
- o **FSDC Mechanism:** Financial Stability and Development Council (FSDC) to evaluate financial regulations' impact and improve responsiveness.
- o **Jan Vishwas Bill 2.0:** Proposed decriminalisation of over 100 provisions in various laws to reduce legal hurdles for businesses.

## TAX REFORMS AND SUPPORT FOR MIDDLE CLASS

- ★ **New Income Tax Slabs:** New tax slabs ensure no income tax for income up to ₹12 Lakh per annum, benefiting salaried individuals with income up to ₹12.75 Lakh per annum due to a standard deduction of ₹75,000.
- ★ **Revenue Impact:** The direct tax proposals will result in a revenue loss of approximately ₹1 lakh crore.
- ★ **TDS/TCS Rationalization:** Tax deduction limits for senior citizens and rent increased, and decriminalization of delay in TDS/TCS payments announced.
- ★ **Voluntary Compliance:** Time limit for filing updated returns extended to four years, encouraging voluntary tax compliance.
- ★ **Charitable Trusts:** Registration period for small charitable trusts extended from 5 to 10 years to reduce compliance burden.
- ★ **Taxpayer Benefits:** Senior citizens benefit from exemptions on withdrawals from National Savings Scheme Accounts starting 29th August 2024.
- ★ **International Taxation:** A scheme for determining arm's length price for international transactions over a three-year block period, aligned with global best practices.
- ★ **Presumptive Taxation:** A scheme introduced for non-residents offering services to resident companies in electronics manufacturing.
- ★ **Customs Tariff Rationalization:** Seven tariffs removed, and a unified cess/surcharge applied for industrial goods.

- ★ **Medicines Relief:** 36 lifesaving medicines exempted from Basic Customs Duty(BCD) for treating cancer, rare diseases, and chronic diseases.
- ★ **Domestic Manufacturing Support:** Exemption on BCD for cobalt powder, lithium-ion battery materials, and critical minerals to boost domestic manufacturing.
- ★ **Textile Machinery:** Two additional shuttle-less looms added to fully exempted textile machinery.

NEW INCOME TAX RATES	
NEW TAX REGIME	
FY26	
Rs 0-4 lakh	Nil
Rs 4-8 lakh	5%
Rs 8-12 lakh	10%
Rs 12-16 lakh	15%
Rs 16-20 lakh	20%
Rs 20-24 lakh	25%
Rs 24 lakh+	30%
Tax rebate for those with income up to Rs 12 lakh	
OLD TAX REGIME	
FY26	
Rs 0-2.5 lakh	Nil
Rs 2.5-5 lakh	5%
Rs 5-10 lakh	20%
Rs 10 lakh+	30%
Those earning up to Rs 5 lakh are entitled to a rebate	
(No announcement made on old tax regime)	

- ★ **Inverted Duty Structure:** BCD adjustments on Interactive Flat Panel Displays and Open Cells to promote "Make in India."
- ★ **Lithium-Ion Battery Manufacturing:** Exemption on BCD for 35 capital goods for EV and 28 capital goods for mobile phone battery manufacturing.
- ★ **Shipbuilding Support:** Continued exemption on BCD for raw materials in shipbuilding for another 10 years.
- ★ **Export Promotion:** Exemption of BCD on Wet Blue leather, reduction of BCD on Frozen Fish Paste from 30% to 5%, and on fish hydrolysate from 15% to 5% for manufacturing fish and shrimp feeds.
- ★ **Middle Class Empowerment:** Acknowledging the middle class's contribution, the new tax structure aims to boost consumption, savings, and investment.



## ANALYSIS OF UNION BUDGET 2025-26

### Q Middle-Class Tax Benefits

- o The tax-free income level has been **raised from Rs. 7 lakh to Rs. 12.75 lakh**, benefiting middle-class taxpayers but excluding the unemployed and non-taxpayers.
- o Estimated direct tax revenue forgone: ₹1 lakh crore.

### Q Political Motives Behind Budget Announcements

- o The tax cuts came just before elections in Delhi and Bihar.
- o Budget allocations aimed at consolidating the middle-class vote bank.
- o Bihar received targeted benefits, including:
  - A greenfield airport.
  - Western Koshi Canal system modernisation.
  - A new board for makhana (fox nut) cultivation (80% of production in Bihar).

### Q Revenue Constraints and Fiscal Management

- o Revenue loss due to past corporate tax cuts and GST inefficiencies.
- o Reliance on exceptional resource mobilisation to compensate for revenue shortfall:
  - **Cesses and surcharges** (not shared with States) raised ₹1.2 lakh crore annually (2022-25).
- o **Non-tax receipts in 2024-25:**
  - o Spectrum sale: ₹1.23 lakh crore.
  - o Public sector special dividends: ₹55,000 crore.
  - o Surplus transfers from RBI and public sector banks: ₹2.3 lakh crore.
  - o Privatisation efforts have underperformed:
  - o Budgeted receipts (2023-24): ₹61,000 crore; actual: ₹33,122 crore (46% shortfall).

- o Revised budgeted estimate (2024-25): ₹50,000 crore, but receipts were 52% lower.

### Q Slowing Economic Growth and Demand Concerns

- o GDP growth estimated to decline:
  - 2023-24: 8.2%
  - 2024-25: 6.4%
  - 2025-26 (projection): Below 6.4% unless demand is revived.
- o **Official Economic Survey acknowledged that:**
  - Consumption demand is weak.
  - Corporate investment remains low despite high profits.
  - Public capital expenditure is insufficient to compensate.

### Q Welfare Spending Cuts

- o Welfare spending has been reduced, with MGNREGA allocations stagnant at ₹86,000 crore, despite wage arrears of ₹6,950 crore.
- o Food subsidy under the National Food Security Act has marginally increased from ₹19.7 lakh crore (2024-25) to ₹20.3 lakh crore (2025-26), but remains lower than ₹27.3 lakh crore in 2022-23.
- o Farmers' demands for higher Minimum Support Prices (MSP) as per the Swaminathan Committee's recommendations remain unaddressed, with only a 4% increase in agriculture allocations.

### Q Favourable Policies for Big Business & Foreign Investors

- o The foreign ownership cap in insurance has been raised from 74% to 100%, potentially increasing foreign direct investment but raising concerns over consumer protection.
- o A new regulatory reform committee is announced

to ease business regulations, though past deregulation has widened income disparities.

- o The government plans to dilute India's bilateral investment treaty template, making it more investor-friendly despite concerns over sovereignty.

## CONCLUSION

The Budget 2025-26 focuses on middle-class tax relief and fiscal consolidation, while welfare cuts and stagnant rural spending raise concerns about inequality. Corporate and foreign investor incentives remain strong, reinforcing a neoliberal policy approach.

# ARTIFICIAL INTELLIGENCE

**Syllabus: GS III - Science & Technology**

## PYQ MAPPING

**Q)** What are the areas of prohibitive labour that can be sustainably managed by robots? Discuss the initiatives that can propel research in premier research institutes for substantive and gainful innovation **(2015)**

**Q)** Introduce the concept of Artificial Intelligence (AI). How does AI help clinical diagnosis? Do you perceive any threat to privacy of the individual in the use of AI in the healthcare? **(2023)**

**Q)** What is the technology being employed for electronic toll collection on highways? What are its advantages and limitations? What are the proposed changes that will make this process seamless? Would this transition carry any potential hazards? **(2024)**

## WHY IN NEWS

Days after a Chinese artificial intelligence (AI) lab launched the low-cost foundational model DeepSeek, the Indian government has said it has decided to build a domestic large language model of its own as part of the Rs 10,370 crore **IndiaAI Mission**.

## INTRODUCTION

India is rapidly emerging as a key player in the global AI landscape, with its vast talent pool and growing adoption of AI-driven solutions across industries. Strategic investments in research, open-source initiatives, and policy support are crucial to positioning India as a leader in AI innovation.

## SHORT TAKES

**GPU (Graphics Processing Unit):** An electronic circuit designed to perform high-speed mathematical calculations, particularly for tasks like graphics rendering, machine learning, and video editing, by applying the same operation to multiple data values simultaneously in parallel, enhancing efficiency for compute-intensive tasks.

## ARTIFICIAL INTELLIGENCE (AI): OVERVIEW AND KEY CONCEPTS

### Definition of AI

- o AI is the capability of machines (especially computers) to perform tasks requiring human intelligence which include **language understanding, pattern recognition, problem-solving, and decision-making**.
- o AI systems can learn from experience and process large amounts of data rapidly.

like Siri, recommendation systems) and cannot generalise beyond its programmed domain.

- o **Artificial General Intelligence (AGI) / Strong AI:** Hypothetical AI that possesses the ability to understand, learn, and apply knowledge across a wide range of tasks, similar to human intelligence.
- o **Superintelligent AI:** AI that surpasses human intelligence in all aspects, including problem-solving, creativity, and social intelligence.

### Functionality-Based Types

- o **Reactive Machines:** AI systems that react to specific stimuli with pre-programmed responses, without the ability to store or learn from past

### Capability-Based Types

- o **Artificial Narrow Intelligence (ANI) / Weak AI:** Specialised for specific tasks (e.g., virtual assistants

experiences (e.g., Deep Blue chess computer).

- o **Limited Memory AI:** AI that uses past experiences and data to make decisions and improve performance over time (e.g., self-driving cars).
- o **Theory of Mind AI:** Advanced AI that would understand emotions, beliefs, intentions, and other human-like aspects, enabling it to interact in a more empathetic manner.
- o **Self-Aware AI:** A theoretical form of AI that has consciousness and can understand its own existence and purpose.
- ➡ **AI Subsets:** Specialised fields within artificial intelligence that focus on specific methods or approaches to achieving machine intelligence.

#### o **Machine Learning (ML)**

## TIMELINE OF EVOLUTION OF AI IN INDIA

### ⌚ Early Days (1960s-1980s):

- o Indian institutes like IIT Kanpur and IISc Bangalore laid the groundwork for AI research.
- o In 1986, the Knowledge Based Computer Systems (KBKS) project marked India's first major AI research initiative.

### ⌚ Foundations (1990s):

- o The establishment of **C-DAC** in 1988 boosted supercomputing capabilities, indirectly supporting AI research.
- o Indian software companies began exploring AI for business process automation.

### ⌚ Growth Phase (2000s):

- o Indian IT giants like TCS, Infosys, and Wipro invested in AI research and development.
- o Academic institutions expanded their AI and machine learning programs.

## IMPORTANCE OF AI

- ⌚ **Automation and Efficiency:** AI-powered systems automate repetitive and labour-intensive tasks, increasing productivity and reducing human errors across industries like manufacturing, logistics, and customer service.
- o **Example:** The Union Ministry of Agriculture & Farmers Welfare has launched an **AI Chatbot for the PM-KISAN scheme**, providing multilingual support and real-time responses to farmers' queries, with plans to expand its availability to all 22 Indian languages.
- ⌚ **Enhanced Decision-Making:** AI analyses vast amounts

- Uses algorithms to learn from data and make predictions.

- Requires manual feature extraction for training models.

- **Example:** Fraud detection in banking.

### o **Deep Learning (DL) (Subset of ML)**

- Uses multi-layered neural networks to automatically extract features from data.
- Requires large datasets and high computational power.

- **Example:** Facial recognition, self-driving cars.

AI continues to evolve and integrate into various fields, shaping the future of technology and human interaction.

### ⌚ Acceleration (2010s):

- o The "**Digital India**" initiative launched in 2014-15 emphasized emerging technologies, including AI.
- o In 2018, NITI Aayog released the National Strategy for Artificial Intelligence.
- o AI-focused startups emerged and attracted significant funding.

### ⌚ Current Era (2020s):

- o AI has become central to both government and private sector initiatives.
- o India is positioning itself as a global AI hub, with applications in healthcare, agriculture, and smart cities.
- o The government launched initiatives like "**AI for All**," integrating AI into sectors like education and governance.

of data to provide real-time insights, enabling businesses, judiciary, governments, and researchers to make more informed and precise decisions.

- o **Example:** In December 2023, the **Manipur High Court used ChatGPT** to clarify that the Village Defence Force (VDF) comprises local volunteers trained to guard villages against threats like insurgency. This information was key in the court's ruling to set aside Zakir Hussain's dismissal from VDF due to procedural flaws.

- ⌚ **Healthcare Advancements:** AI assists in early disease detection, personalised treatment plans, robotic

surgeries, and drug discovery, improving patient outcomes and reducing healthcare costs.

- **Example:** AI-powered **Microsoft HoloLens, introduced at Peerless Hospital** in Kolkata, enhances precision in knee and joint-replacement surgeries by providing surgeons with a 3D holographic view of the entire limb, reducing human error and offering personalized alignment for implants.
- **Economic Growth and Job Creation:** AI drives innovation by enabling new business models, increasing efficiency in industries, and creating demand for AI-related skills and services.
- **Example:** A study by ServiceNow, in collaboration with Pearson, has projected that AI could actually drive employment growth, creating an estimated 2.73 million jobs in India by 2028.
- **Security and Cybersecurity:** AI enhances threat detection, fraud prevention, and real-time monitoring, strengthening defence mechanisms in financial transactions, national security, and digital platforms.
- **Example:** MuleHunter.AI is an AI-powered tool developed by the Reserve Bank Innovation Hub to efficiently detect and eliminate mule accounts involved in money laundering and cybercrimes by analyzing account activity patterns.
- **Scientific Research and Innovation:** AI accelerates research by processing complex datasets in fields like genomics, astronomy, physics, and material science, leading to groundbreaking discoveries.
- **Example:** Indian scientists have developed a machine learning-based approach to predict Earth's crust movements over the Tibetan Plateau, offering a cost-effective and accurate alternative to traditional GPS-based methods.
- **Environmental Sustainability:** AI optimises energy consumption, improves climate predictions, and enhances resource management in industries like agriculture, water conservation, and renewable energy.
- **Example:** The National Remote Sensing Centre (NRSC), a programme under the auspices of the Indian Space Research Organization (ISRO), has engineered a new AI enabled monitoring system to observe forest cover change and combat deforestation.
- **Disaster Prediction and Management:** AI improves early warning systems for natural disasters, enhances crisis response, and optimises resource allocation in relief operations.
- **Example:** Climate Software Lab (CSL) has launched an AI-based Landslide Risk Assessment model to map landslide risks in vulnerable areas of the Indian subcontinent, impacting around 40 lakh people.
- **Education and Skill Development:** AI enhances learning through personalised education, automated assessments, intelligent tutoring systems, and adaptive learning platforms, making education more efficient and accessible.
- **Example:** Medha AI, India's first teacher-assistive AI developed by Cograd, is revolutionising education in rural areas of Uttarakhand by providing offline support for lesson planning, content delivery, and student assessment.
- **Improved Accessibility and Inclusivity:** AI-powered assistive technologies help individuals with disabilities by enabling speech-to-text, real-time translations, and personalised learning tools.
- **Example:** IIT-Hyderabad has developed "Swarajability," an AI-based job platform for people with disabilities, to help them access tech sector opportunities, with support from Kotak Mahindra Bank, Visual Quest India, and Youth4Jobs.

## GLOBAL INITIATIVES

### UN AI Governance Initiatives

- The UN has been working on a strategic AI roadmap since 2019, focusing on ethical AI principles and capacity development.
- The 2023 High-Level Committee on Programmes and Management joint session, hosted by UNICEF, reinforced AI governance discussions.

### Global Initiative on AI for Health (GI-AI4H):

- Launched in July 2023, under WHO, ITU, and the World Intellectual Property Organization (WIPO), the GI-AI4H stands as a resilient, long-term

institutional structure, grounded in its mission to enable, facilitate, and implement AI in healthcare.

### US

- **Stargate Initiative:** The US launched the initiative, committing billions to semiconductor investments.
  - The goal: **Create 100,000 jobs and secure the US's position** as a leader in AI technology.
- **OpenAI's ChatGPT:** Based in the US, OpenAI, led by Sam Altman, emerged as a strong competitor with its advanced GPT models, including GPT-4 Turbo.

## ☀ China

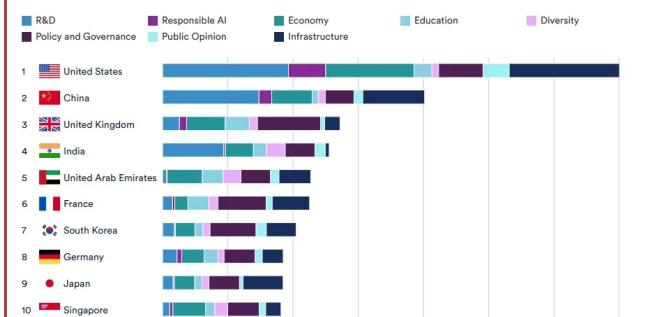
- **Chinese AI startup DeepSeek** developed an **open-source AI model** in under two years with minimal capital.
  - Compared to OpenAI's \$6.6 billion funding and 4,500 employees, DeepSeek accomplished much with only **200 employees** and **less than \$10 million**.

## ☀ France

- **Mistral**, a leading French AI startup, has launched Le Chat, an AI chatbot app for iOS and Android, offering conversational AI-generated responses.

### 2023 Global AI Vibrancy Ranking

Weighted Index Score | Source: 2025 AI Index



## INDIAN INITIATIVES

### 🌐 IndiaAI Mission

- The IndiaAI Mission aims to develop a **domestic large language model** focusing on Indian languages, culture, and context, ensuring bias-free technology and technological self-reliance.
- The mission will also **reduce overdependence on foreign AI models**.
- The government is funding **18 AI solutions** focused on **agriculture, learning disabilities, and climate change**

### 🌐 AI for India 2.0 :

- Aims to equip youth with frontier skills in Artificial Intelligence.
- A joint initiative of Skill India and GUVI, this IIT Madras-accredited online course is offered in 9 Indian languages to break language barriers in

## ISSUES WITH AI

### ▼ Bias and Discrimination:

AI systems can inherit biases from training data, leading to unfair treatment in hiring, lending, law enforcement, and other critical areas.

- **Example:** Amazon scrapped its AI recruitment tool after it became clear that it was biased against women, as it was trained on data predominantly from male applicants, leading the system to penalise resumes with gender-specific terms.

### ▼ Privacy and Data Security:

- AI-driven surveillance and data analytics raise risks for privacy, democracy, and decision-making.
- AI is used for behavioural profiling, influencing consumer and political choices.
- **Example:** Several countries and government agencies, including Italy, Taiwan, Australia, South Korea, NASA etc have **banned or restricted the use**

technology education, particularly in rural areas.

○ **Niramai:** A health-tech startup, uses AI to detect early signs of breast cancer, contributing to healthcare innovations.

○ **BHASHINI:** An AI initiative, supports 22+ languages to promote inclusivity and has powered over 100 million inferences, demonstrating its broad application and reliability.

○ **AI4Bharat:** A research lab at IIT Madras, advances AI for Indian languages through open-source contributions, developing state-of-the-art models in transliteration, translation, and speech processing

○ **BhasaAnuvaad:** Created by AI4Bharat, it covers 44,400 hours of audio across 13 Indian languages, making it the most extensive dataset for Indian speech translation.

**of DeepSeek's AI** over data privacy and security concerns,

▼ **Job Displacement:** Automation threatens traditional employment, especially in repetitive, low-skill jobs, requiring workforce reskilling to adapt to AI-driven industries.

▼ **Ethical Concerns:** AI applications in autonomous weapons, deepfake technology, and mass surveillance pose significant ethical dilemmas and risks to human rights.

▼ **Regulatory Challenges:** The rapid advancement of AI outpaces legal and regulatory frameworks, leading to gaps in governance, liability, and enforcement.

▼ **Dependence on Big Tech :** AI development is concentrated in a few major corporations, raising concerns about monopolies, unequal access, and corporate control over AI advancements.

### ▼ Energy Consumption and Environmental Impact:

**Impact:** Training large AI models requires massive computational power, leading to high energy consumption and increased carbon emissions.

### ▼ Lack of Emotional Intelligence:

AI lacks human empathy, making it unsuitable for roles requiring emotional understanding, such as mental health

support and caregiving.

### ▼ National Security Concerns:

AI's potential to be used in military applications raises global security risks, especially regarding autonomous weapons.

- o **Example:** Lethal autonomous weapons systems (LAWs) could lead to unaccountable warfare, challenging international humanitarian law.

## WAY FORWARD FOR INDIA'S AI LEADERSHIP

### ✳ Establish a Balanced AI Regulatory Framework:

Combine the strengths of three different governance models

- o **US Model (Techno-Optimism):** Free-market AI development with minimal regulation.
- o **China Model (State-Driven):** AI development under strict government control.
- o **EU Model (Regulated Digital Economy):** Focus on human rights and ethical AI.

### ✳ Global AI Governance Framework:

Establish a universal AI regulatory framework under the UN to ensure ethical development and prevent misuse.

### ✳ Open-Source Ecosystem:

India should foster a culture of open-source AI development, encouraging engineering brilliance while making AI solutions accessible for all.

### ✳ Develop Sovereign AI Models:

Build AI models tailored to **India's data** sets, ensuring **bias-free** solutions for local needs, and not just focusing on application but creating **end-to-end AI ecosystems**.

### ✳ AI for Social Impact:

India should prioritize AI solutions that address national challenges, such as healthcare diagnostics, financial inclusion, and agricultural productivity.

- o **Example:** India is home to over **240 Gen AI startups**, with **70% focused on industry-specific challenges** across sectors like **healthcare**,

**education, BFSI, and agriculture**

### ✳ Multilingual and Multimodal Models:

Focus on developing AI models that can address the needs of **India's 22 official languages** and local dialects, fostering greater inclusivity.

### ✳ AI Diffusion and Global Leadership:

Secure India's position as a **Tier-I country** in the **AI diffusion** realm, eliminating the **restrictions** faced in access to advanced hardware and training of frontier AI models

- o India has 420,000 AI professionals, the largest AI workforce globally, with 92% enterprise adoption and a \$17-billion market potential.

### ✳ Strengthen AI Hardware Ecosystem:

Develop AI hardware capabilities, such as **GPUs**, within the country to reduce reliance on external suppliers and ensure technological sovereignty.

### ✳ Foster Collaboration for Global Supply Chains:

Position India as an **indispensable partner** in global **AI hardware** and **software supply chains**, increasing its influence and leadership on the international stage

### ✳ Enhance AI Education & Skilling:

AI-related courses should be integrated into higher education curricula, with a focus on programming, statistics, and algorithm development.

### ✳ International Collaboration on AI Research:

Strengthen partnerships between nations to develop transparent, unbiased, and accountable AI systems.

## CONCLUSION

For India to move beyond being a service provider in AI and become a global leader, it must prioritise deep-tech research, reduce dependency on foreign models, and build an independent AI ecosystem. Strategic collaboration between academia, industry, and government is essential to drive long-term innovation and establish India as a key player in shaping AI's future.

## SAMPLE QUESTION

**Q) Artificial Intelligence is revolutionizing various sectors, including healthcare, agriculture, and education. Discuss the potential benefits and risks of AI in transforming India's economy. What steps should the government take to harness its potential effectively? (10 marks) (150 words)**

## WEEKLY DOSSIERS

### GLACIAL RETREAT IN ARUNANCHAL PRADESH AND ITS IMPLICATIONS

Glaciers are vital freshwater reserves and play a crucial role in maintaining regional hydrology. However, climate change has accelerated the rate of glacial retreat, leading to serious environmental and socio-economic consequences. A recent study by researchers from Nagaland University and Cotton University has revealed alarming glacial loss in Arunachal Pradesh, highlighting the risks of **glacial lake outburst floods (GLOFs)**, **water scarcity**, and **ecosystem disruptions**.



#### FINDINGS OF THE STUDY

- ◆ The study covered the period **1988-2020** and focused on glaciers in Arunachal Pradesh, from **Tawang to Lohit districts** through **West Kameng, Kurung Kumey, Upper Siang, and Upper Dibang Valley**.
- ◆ **Key observations:**
  - **110** glaciers disappeared over 32 years
  - Glacier numbers reduced from **756** to **646**.

#### GLOBAL AND REGIONAL CONTEXT

- ◆ The Himalayas are often referred to as the '**Third Pole**', as they house the **largest collection of glaciers outside the polar regions**, supplying freshwater to over **1.3 billion people** downstream.
- ◆ Himalayan glaciers are melting **faster than the global average**, with a **yearly area loss of 0.4%** due to climate

- **Glacial area loss: 309.85 sq. km**, a **47% decline** from the initial **585.23 sq. km**.
- The glaciers **retreated at an alarming rate of 16.94 sq. km per year**.
- Most glaciers studied lie at **4,500-4,800 metres above sea level** and are **north-facing**.

#### IMPLICATION AND RAPID GLACIAL RETREAT

##### 1. Increased Risk of Glacial Lake Outburst Floods (GLOFs)

- ◆ As glaciers melt, **new glacial lakes form**, increasing the risk of **sudden outburst floods**.
- ◆ The **2023 Sikkim GLOF disaster**, which killed at least **55 people** and destroyed a **1,200 MW hydropower project on the Teesta River**, is a stark warning.

##### 2. Threat to Water Security

- ◆ The loss of glaciers will **reduce freshwater availability**, affecting:
  - Drinking water supplies
  - Irrigation for agriculture.
  - Hydropower generation.

- ◆ **change.**
- ◆ Eastern Himalayan temperatures are **rising between 0.1° and 0.8°C per decade**, exceeding the global warming trend.
- ◆ The **projected temperature rise of 5-6°C by 2100** will further accelerate glacial retreat.

##### 3. Hydrological and Ecological Disruptions

- ◆ Glacial meltwater feeds major rivers such as the **Brahmaputra**. Its decline will:
  - **Alter river flow patterns**, causing **seasonal water shortages**.
  - Affect **fish populations and aquatic biodiversity**.
  - Lead to **soil erosion and loss of fertile land**.

##### 4. Impacts on Local Communities

- ◆ **Livelihood Disruptions:** Agriculture and pastoral communities relying on glacier-fed water sources will suffer.
- ◆ **Infrastructure Damage:** Increased floods and landslides will **destroy roads, bridges, and**

settlements.

- ◆ **Cultural and Spiritual Impact:** Many glaciers are **sacred sites for indigenous communities**; their loss impacts traditional beliefs and practices.

## MITIGATION STRATEGIES AND RECOMMENDATIONS

### 1. Strengthening Glacial Monitoring Systems

- ◆ Expand remote sensing and satellite monitoring to track glacier retreat.
- ◆ Install early warning systems to detect GLOFs.

### 2. Sustainable Water Management

- ◆ Develop **glacial lake drainage systems** to prevent outburst floods.
- ◆ Promote **rainwater harvesting** and **glacial water storage techniques**.

### CONCLUSION

The rapid retreat of glaciers in Arunachal Pradesh is a **clear warning of accelerating climate change**. The loss of these glaciers threatens **water security, ecosystems, and human lives**, particularly due to **GLOFs and hydrological disruptions**. Immediate and **coordinated action** is essential to **monitor, mitigate, and adapt** to these changes.

## THE PROMISE AND CHALLENGES OF USING BACTERIA TO ELIMINATE PLASTIC POLLUTION

Plastic pollution has become one of the most pressing environmental issues of our time. Despite efforts to recycle, only about 10% of the 8.3 billion tonnes of plastic produced globally since large-scale production began has been recycled.

### BACKGROUND

Plastic waste is a major contributor to land and marine pollution. Conventional recycling methods are inadequate due to:

- ◆ The **low recycling rate** of plastics.
- ◆ **Difficulties in processing different plastic types**, especially highly crystalline PET (found in water

bottles).

- ◆ The **slow degradation rate** of plastics in nature, which can take hundreds of years.

Scientists have been exploring biological solutions, particularly enzymes and bacteria, that can degrade plastics efficiently.

### KEY INNOVATIONS IN PLASTIC DEGRADATION USING BACTERIA

#### ◆ Enzyme-Based Degradation

- Scientists have identified natural enzymes capable of breaking down polyethylene terephthalate (PET), a common plastic.
- **Kohei Oda's discovery** of *Ideonella sakaiensis* introduced two enzymes capable of breaking down PET.
- **Apratima Biosolutions** developed an enzyme that can degrade **90% of PET waste in 17 hours**.
- **Carbios (France)** engineered a heat-stable enzyme that degrades **90% of PET in 10 hours**.
- ◆ **Bacteria-Based Degradation**
- **Breaking Inc. (Harvard researchers)** identified the

bacterium X-32, which can degrade PET, polyolefins (found in packaging), and polyamides (like nylon).

- The bacteria take **22 months to degrade plastic into CO<sub>2</sub>, water, and biomass**, but researchers are working on speeding up the process.
- **Jon Pokorski's team (UC San Diego)** is developing plastic infused with bacterial spores, which remain dormant until the plastic is placed in compost. The process takes **five months to degrade 90% of the plastic**.
- **Nathan Crook (North Carolina State University)** is engineering fast-growing bacteria (*Vibrio natriegens*) that can evolve to break down PET more efficiently.

## ADVANTAGES OF BIOLOGICAL SOLUTIONS

- ◆ **Potential for scalability:** Enzymes and bacteria could offer a continuous, sustainable way to degrade plastic.
- ◆ **Circular economy:** The breakdown products

## CHALLENGES AND LIMITATIONS

- ◆ **Speed of Degradation**
  - While some enzymes work within hours, bacterial degradation still takes months to years.
  - To be industrially viable, degradation must occur within **days, not months**.
- ◆ **Scaling Up the Technology**
  - Large-scale fermentation is needed to produce enough enzymes or bacteria.
  - **Cost of production and enzyme purification** remains a significant barrier.

## FUTURE PROSPECTS AND CONCLUSION

The biological approach to plastic degradation shows immense promise but requires further advancements in efficiency and scalability. Scientists, startups, and large companies are racing to develop cost-effective solutions that can work at an industrial scale.

To accelerate progress, the following steps are necessary:

- ◆ **More research funding** for enzyme and bacterial evolution.
- ◆ **Public-private partnerships** to commercialize these

(terephthalic acid and ethylene glycol) can be reused.

- ◆ **Customization:** Scientists can engineer bacteria to target specific plastics.
- ◆ **Regulatory and Public Acceptance Issues**
  - Bacteria-infused plastics may raise **safety and environmental concerns**.
  - Government approvals and regulations can slow adoption.
- ◆ **Versatility and Efficiency**
  - Many enzymes work only on specific plastics (e.g., PET), but other plastics (e.g., polyolefins) remain a challenge.

High-crystallinity PET in bottles is harder to degrade than packaging-grade PET.

technologies.

- ◆ **Government incentives** for biodegradable plastics and bacterial degradation plants.
- ◆ **Greater focus on microbial and enzyme engineering** to break down multiple plastic types efficiently.

With continued innovation and investment, the dream of eliminating plastic pollution through bacteria and enzymes could soon become a reality.

## INDUSTRIAL POLLUTION AND THE DECLINE OF TRADITIONAL FISHING IN NAVI MUMBAI

Navi Mumbai's water bodies, once rich in marine biodiversity, have been severely impacted by industrial pollution. Traditional fishermen, dependent on these water bodies for generations, are facing an existential crisis. This case study explores the environmental, economic, and social consequences of industrial pollution and the legal recourse being pursued by the fishing community.

### BACKGROUND

- ◆ Navi Mumbai is home to over **3,254 industrial units** engaged in manufacturing chemicals, dyes, pharmaceuticals, petrochemicals, and textiles.
- ◆ The **release of untreated industrial effluents** into creeks, lakes, and rivers has turned the water

black, leaving behind dead marine life.

- ◆ Fishing zones such as **Diwale, Kharghar, and Mansarovar creeks**, which sustained fishing communities for centuries, have become uninhabitable for aquatic organisms.

dissolved oxygen, making survival impossible for marine life.

- ◆ The **direct discharge of untreated effluents** is blamed for the death of fish and aquatic organisms.

### KEY FINDINGS

- ◆ The water has turned **jet black and emits a chemical odor**.
- ◆ High levels of **chemical and biochemical oxygen demand (COD/BOD)** indicate severe depletion of

## SOCIO-ECONOMIC IMPACT

- ◆ **Loss of livelihood:**
  - The **Koli fishing community**, original inhabitants of the region, are forced to abandon their traditional trade.
  - **6,000 out of 10,000 fishermen** have been forced to seek alternative jobs as security guards, domestic help, and daily wage laborers.
- ◆ **Health hazards:**
  - Fishermen reported **skin allergies and respiratory issues** after venturing into polluted waters.
  - The **acidic nature of water** makes it hazardous for human and marine life.

## LEGAL AND ADMINISTRATIVE REFORMS

- ◆ **Fishermen's legal action:**
  - The **Maharashtra Small Scale Traditional Fish Workers Union** is filing a **Public Interest Litigation (PIL) at the Bombay High Court** to demand urgent intervention.
- ◆ **Government inaction and conflicting claims:**
  - The **Panvel Municipal Corporation (PMC)** acknowledges the pollution crisis and has received

## RECOMMENDATIONS AND SOLUTIONS

- ◆ **Strict industrial regulation:**
  - Immediate enforcement of **wastewater treatment norms** before discharge.
  - Penalizing industries violating environmental laws.
- ◆ **Restoration of fishing zones:**
  - Implementing a **cleanup drive** in affected creeks.
  - Establishing **alternative fishing zones** with controlled water quality.

## CONCLUSION

The case of **Navi Mumbai's polluted creeks** highlights the devastating impact of industrial pollution on the environment and local communities. Without **urgent legal, administrative, and policy interventions**, the traditional Koli fishing trade faces extinction. The upcoming PIL at the Bombay High Court may serve as a turning point in securing environmental justice for these fishermen.

- Many are now **buying ocean fish from Mumbai** to resell in their villages, increasing financial strain.

- ◆ **Health hazards:**
  - Fishermen reported **skin allergies and respiratory issues** after venturing into polluted waters.
  - The **acidic nature of water** makes it hazardous for human and marine life.

numerous complaints.

- **Maharashtra Pollution Control Board (MPCB)** denies pollution claims, stating that recent monitoring reports show compliance.
- **Maharashtra Industrial Development Corporation (MIDC)** is extending a disposal pipeline, raising fears of further damage to Thane and Nhava Sheva creeks.

- ◆ **Compensation and alternative employment:**

- Financial relief for displaced fishermen.
- Government-led **skill development programs** for alternative livelihood options.

- ◆ **Legal and policy reforms:**

- Strengthening environmental laws related to **waste disposal and industrial pollution**.
- Creating an **independent monitoring committee** with fishermen representatives.

## ETHICS - CASE STUDY

**Q**) You are a newly appointed District Collector in a region facing severe resistance to a government infrastructure project. The local community, comprising mostly farmers and indigenous groups, fears displacement and environmental damage. Their negative attitude toward the government stems from past unfulfilled promises and lack of proper rehabilitation efforts. Despite multiple awareness campaigns, public meetings, and assurances of fair compensation, the community remains hostile and distrustful. Meanwhile, the project is of national importance, and delaying it further could lead to financial losses and missed development opportunities.

- Analyze the role of **attitude** in shaping public perception and resistance in this case.
- What **ethical dilemmas** do you face in ensuring both progress and justice?
- Suggest **three strategies** to positively influence public attitude and gain community trust while ensuring ethical governance.

## ETHICS - EXAMPLES

- Good Governance:** Since November 2020, Karnataka has revamped over 5,800 rural libraries under the Oduva Belaku programme, led by Uma Mahadevan Dasgupta, Additional Chief Secretary & Development Commissioner of Karnataka, with support from non-profits like the Azim Premji Foundation and Pratham Books. These libraries serve as community resource centres, enrolling 50 lakh children for free and providing digital tools like Alexa for the visually challenged.
- Environmental Ethics:** ATREE-CERC, a unit of the Ashoka Trust for Research in Ecology and the Environment, is leading a community-driven conservation effort for Vembanad Lake, a Ramsar site facing threats from pollution and urbanisation. It has introduced Deliberative Democratic Conservation, empowering local stakeholders and establishing Lake Protection Forums (LPFs) to restore clam beds and create mini fish sanctuaries.
- Medical Ethics:** Karnataka became the second state after Kerala to implement the Supreme Court's directive on passive euthanasia, allowing the withdrawal of life-sustaining treatment for terminally ill patients, as per the court's prescribed procedure.
- Social Justice:** The Supreme Court ordered a complete ban on manual scavenging and hazardous sewer cleaning in Delhi, Mumbai, Chennai, Kolkata, Bengaluru, and Hyderabad, directing state officials to submit implementation reports by February 13.
- Environmental Ethics:** Edamalakkudy, Kerala's first tribal panchayat, is set to become waste-free under the Haritha Keralam Mission's Malinya Muktha Nava Keralam campaign, alongside initiatives to revive millet farming, prevent wildlife incursions, and promote green protocols in institutions.
- AI Ethics:** The Delhi High Court is hearing ANI's copyright infringement case against OpenAI, with the latter arguing that its terms of use require disputes to be settled in California, while industry bodies DNPA and FIP have intervened, potentially expanding the case's scope.
- Lack of Integrity:** A Gurugram-based doctor falsely claimed his Apple Watch was stolen at Delhi's IGI airport, but CISF CCTV footage showed he wore it after security screening. The doctor, who identified alleged culprits by religion in his since-deleted post, was urged not to spread misinformation.
- Social Responsibility:** Prasanna Shirol founded the Organization for Rare Diseases India (ORDI) in 2014 after his daughter Nidhi was diagnosed as India's first Pompe patient. His advocacy led to the sanctioning of ₹100 crore under the National Rare Disease Fund (NRDF) in 2017 and the establishment of the Rare Diseases Care Coordination Centre (RDCCC) in Bengaluru.
- Emotional Intelligence (EI) and Empathy:** Mihir Ahammed, a 15-year-old schoolboy from Kochi, died by suicide after allegedly facing brutal ragging, including physical assault and humiliation, with his mother accusing a group of students of forcing him to lick a toilet seat and bullying him over his skin colour. She has sought an impartial probe, alleging the school's attempt to suppress evidence, while the Kerala government has ordered an investigation.

## MODEL ESSAY

*"Real knowledge is to know the extent of one's ignorance"*

### Introduction

- Quote attributed to Confucius
- Definition of **real knowledge** as an awareness of one's limitations.
- Importance of intellectual humility in learning and progress.

### Philosophical Foundations

- **Socratic Method:**
- Involves asking **probing questions** to challenge assumptions and uncover deeper truths.
- Socratic paradox: "I know that I know nothing"
- **Kant's Epistemology:**
- Argued that human knowledge is **limited by experience** and the way our minds process information.
- Distinguished between: **Phenomena (things as they appear to us)** and **Noumena (things as they are in themselves)**

### Importance

- **Scientific Progress:** Scientific discoveries evolve because researchers acknowledge knowledge gaps and refine theories **Eg:** Louis Pasteur's Germ Theory replaced the earlier belief in spontaneous generation
- **Better Decision-Making:** Recognising ignorance helps individuals and policymakers make more informed and cautious decisions.
- **Ethical and Moral Growth:** Acknowledging ignorance leads to respect for diverse perspectives and reduces dogmatism.
- **Effective Leadership:** Great leaders seek advice, acknowledge limitations, and remain flexible in decision-making **Eg:** **Abraham Lincoln's "Team of Rivals"** strategy involved appointing critics to his cabinet, ensuring diverse viewpoints.
- **Personal Growth:** People who recognise their ignorance embrace lifelong learning and self-improvement.

### Challenges and Misconceptions

- Excessive self-doubt can lead to **indecisiveness and hesitation**, preventing effective action.
- Some misuse false humility to **avoid accountability**.
- Recognising ignorance should not mean **blindly following authority without questioning**.
- Ignorance is often **seen as weakness**, discouraging honest admission.
- In some situations, acknowledging ignorance may **reduce trust or create panic**.

### Way Forward

- **Promote a Culture of Humility and Learning:** Embrace continuous learning and acknowledge limitations.
- **Encourage Open Dialogue:** Foster environments where admitting ignorance is seen as an opportunity for growth rather than failure
- **Support Evidence-Based Decision Making:** Emphasize the importance of research and data-driven decisions while remaining open to new insights

### Conclusion

- True wisdom lies in recognizing the vastness of the unknown.
- Intellectual humility leads to growth, innovation, and ethical decision-making.
- Real knowledge is not just about accumulating facts but understanding the limits of our understanding.

### Sample Quotes

- *The farther backward you can look, the farther forward you can see* -Winston Churchill
- *You aren't wealthy until you have something money can't buy* -Garth Brooks
- *Opinion is the medium between knowledge and ignorance* - Plato

## MAINS JOT DOWN



### GS- I - ART & CULTURE

- Dashavatara is a **traditional theatre form** with an **800-year-old history**, depicting the **ten incarnations of Lord Vishnu**—Matsya, Kurma, Varaha, Narasimha, Vaman, Parashuram, Ram, Krishna, Buddha, and Kalki.
- Performers use **bright costumes and makeup**, accompanied by a **paddle harmonium, tabla, and cymbals**.
- It remains popular in the **Sindhudurg district of Maharashtra's South Konkan region and North Goa**.
  
- **Dhimsa Dance**, performed by the hill tribes of **Araku Valley, Andhra Pradesh**, is believed to have originated in **Koraput, Odisha**.
- This vibrant folk dance features **15 to 20 women** dressed in traditional attire, led by a performer carrying a **peacock feather**.
- Accompanied by instruments like **Mori, Thudum, and Dappu**, Dhimsa is a celebration of tribal culture and unity.



### GS- I -ROLE OF WOMEN AND WOMEN ORGANISATIONS

- The Ministry of Skill Development and Entrepreneurship (MSDE), in collaboration with NITI Aayog, has launched **Swavalambini**, a women-focused entrepreneurship programme for Assam, Meghalaya, and Mizoram.
- **Key Objectives:**
  - » Empowering female students in selected Higher Education Institutions (HEIs) across the Northeast.
  - » Equipping them with an entrepreneurial mindset, resources, and mentorship to foster innovation and business growth.
  - » Providing six months of mentorship and handholding support to help transform ideas into sustainable enterprises.
- This initiative aims to strengthen women-led entrepreneurship in the region, creating economic opportunities and fostering self-reliance.



### GS- III - BIODIVERSITY



### GS- III - AGRICULTURE

- The **Union Budget 2025-26** announced the establishment of a **dedicated Makhana Board** to boost production, streamline processing, and enhance value addition.
- **Makhana (Euryale ferox)**, a flowering plant from the **water lily family (Nymphaeaceae)**, is the only extant species in its genus.
- It thrives in **temperatures of 20-35°C, relative humidity of 50-90%, and annual rainfall of 100-250 cm**. A fully **organic, non-cereal food**, it is primarily grown in **India**, with presence in **Korea, Japan, and eastern Russia**.
- **Bihar** produces nearly **90% of India's makhana**, and in **2022, 'Mithila Makhana' received a GI tag**.

- A recent study highlights the threat to **Rhododendron wattii** in Nagaland, while a new orchid species has been recorded in Manipur.
- **About Rhododendron**
  - » One of the largest flowering plant genera with 1,000+ wild species.
  - » Primarily found in the Himalayas and Southeast Asia, with smaller populations in North America, Europe, the Middle East, and northeast Australia.
- **Recognition:**
  - » Rhododendron arboreum – National flower of Nepal (Lali Gurans).
  - » Pink Rhododendron – State flower of Himachal Pradesh.
- **Significance:** An indicator of climate change and widely used in traditional medicine.



### GS- III -DEFENCE

- ➡ The Defence Ministry has signed contracts worth **Rs. 10,147 crore** for the procurement of **ammunition** for the **Pinaka Multi-Barrel Rocket Launcher (MRLS)**.
- ➡ Developed by **DRDO**, Pinaka is a high-performance **multi-barrel rocket system** capable of launching **12 rockets in just 44 seconds**.
- ➡ With an extended **range of 60 km (Pinaka Mk-II)**, it enhances **precision artillery strikes** and strengthens **Artillery Rocket Regiments** for long-range engagements.
- ➡ This system significantly boosts **battlefield effectiveness**, and **Armenia** has become its first export customer.



### GS- III -MANUFACTURING INDUSTRY

- ➡ India has emerged as the **world's second-largest mobile manufacturing country** after China, with **99.2% of all mobile phones sold in India being locally made**.
- ➡ Mobile phones contribute **43% of India's total electronics production**.
- ➡ The **electronics sector** has witnessed rapid growth, reaching a **valuation of USD 155 billion in FY23**, with production nearly **doubling from USD 48 billion in FY17 to USD 101 billion in FY23**.
- ➡ Electronics has also become **India's fifth-largest export commodity**, though the country holds **less than 1% of the global market share**.



### GS- II -HEALTH

- ➡ An **eight-year-old girl** from **Kottakkal, Malappuram (Kerala)** recently died of **Brucellosis**, a **bacterial disease** caused by **Brucella species**, primarily affecting **cattle, swine, goats, sheep, and dogs**.
- ➡ **Brucella melitensis** is the most common species responsible for human infections worldwide.
- ➡ The disease spreads through **direct contact with infected animals, consumption of contaminated animal products, or inhalation of airborne agents**, while **human-to-human transmission is rare**.
- ➡ **Urbanization, expansion of animal industries, and poor hygiene in animal husbandry and food handling** increase the risk of its spread.

- ➡ The **Department of Biotechnology (DBT)** has launched **GARBH-INi-DRISHTI** at the **Translational Health Science and Technology Institute (THSTI)** in Faridabad, Haryana.
- ➡ It is a **data dashboard** offering a detailed overview of **one of South Asia's largest maternal and child health databases**.
- ➡ Developed under the **GARBH-INi program**, it provides access to **clinical data, images, and biospecimens** from over **12,000 pregnant women, newborns, and postpartum mothers**.
- ➡ As a **flagship DBT initiative**, it aims to **reduce adverse pregnancy outcomes** and improve maternal and child healthcare.

## CHERRYPICKS OF THE WEEK

### QUIPU SUPERSTRUCTURE

- The **Quipu Superstructure** is an enormous cosmic formation with a mass of **200 quadrillion solar masses**, extending across **1.3 billion light-years**.
  - Superstructures are vast cosmic formations that encompass multiple **galaxy clusters and superclusters**, making them some of the largest known structures in the universe.

### OPIOIDS

- They are a class of drugs that either originate from or mimic natural compounds found in the opium poppy plant.
- They are primarily used for pain relief and include substances such as oxycodone, morphine, and heroin.
- While opioids are highly effective painkillers, they also carry a significant risk of addiction.

### GIFFEN GOOD

- It is a basic, non-luxury product that contradicts standard economic and consumer demand theories.
- Unlike typical goods, its demand **increases as its price rises** and **decreases when its price falls**.
- Example: Bread, wheat, rice

### INSIDER TRADING

- It refers to the buying or selling of a publicly traded company's stock using **nonpublic, material information** that could significantly influence investment decisions.
- Material, nonpublic information** is any undisclosed data that may substantially affect an investor's choice to buy or sell a security.

### PREDATORY JOURNALS

- They are journals that charge authors to publish their work but do not provide proper peer review or editing services.
- They are often dishonest and lack transparency, and their goal is to deceive authors and readers.