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FOR UPSC CIVIL SERVICE EXAMINATION

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Table of Contents

1. Distress in Uttar Pradesh Industrial Clusters Due to U.S. Tariffs.....	2
2. SEBI's Caution on Unregulated 'Digital Gold'	3
3. Proposed Reforms to Sugarcane (Control) Order, 1966.....	5
4. Plunge in MGNREGA Demand: A Seasonal Trend	6
5. Deepening Economic Partnership: India's Push for CECA with Australia	7
6. China Suspends Ban on Critical Mineral Exports to US.....	9
7. Global Bond Yields: Markets Flash Amber Warning.....	10
8. Monetary Policy and the K-Shaped Economy.....	11
9. Delayed Transparency in Air India AI 171 Crash Investigation	12
10. Functional Foods and Smart Proteins: India's Nutritional Future	14



1. Distress in Uttar Pradesh Industrial Clusters Due to U.S. Tariffs

Context of the Crisis

The industrial clusters in Uttar Pradesh (U.P.) are facing severe distress following the imposition of a **50% tariff** by the U.S. on certain Indian export products. This rate includes an **additional 25%** announced in August.

- **Impact:** The tariffs have resulted in:
 - **Reduced orders and halted production.**
 - **Rising debt** for units.
 - Significant **job losses** among artisans and workers.



Major Affected Industrial Clusters

Cluster	Key Industry	Impact Detail
Moradabad	Brass Handicraft	Facing widespread order cancellations and serious financial strain.
Firozabad	Glassware Sector	Reported 35–50% decline in U.S. orders, affecting 8,000–10,000 artisans.
Bhadohi–Mirzapur	Handmade Carpets	Witnessing ~30% loss . This cluster accounts for 60% of India's ₹17,000 crore carpet exports, with the U.S. market constituting 58.6% of its exports.
Kanpur	Leather and Tannery	Facing a ~20% dip in export demand, leading to downsizing and layoffs .

Economic Importance of U.P.'s MSMEs

- **Output Contribution:** MSMEs contribute **over 60%** of Uttar Pradesh's total industrial output.
- **Employment:** They provide employment to **more than 90 lakh** people, primarily skilled and semi-skilled artisans.
- **Threat:** Prolonged distress in these labour-intensive sectors threatens incomes, local economies, and India's overall export competitiveness.

Key Term – Tariff: A tariff is a tax imposed on imported goods by a country. Higher tariffs on Indian products in the U.S. make them **costlier** for U.S. buyers, which significantly reduces demand and hurts Indian exporters.

Legal and Policy Context

This situation is governed by:

- **Foreign Trade (Development and Regulation) Act, 1992:** The foundational framework for India's foreign trade policy.



- **MSME Development Act, 2006:** Aims to facilitate credit flow, technology upgradation, and capacity strengthening for Micro, Small, and Medium Enterprises.
- **Government Schemes:** Schemes like RoDTEP (Remission of Duties and Taxes on Exported Products), Interest Equalisation Scheme, and Export Promotion Councils are currently in place to support export sectors.

Industry Demands & Required Policy Measures

Exporters and trade associations are urgently calling for a **government bailout** to mitigate the damage. This package should include:

- **Credit Relief and Working Capital Loans.**
- **Wage Support** for laid-off or underemployed artisans.
- **Market Diversification Assistance** (to reduce dependence on a single market).
- **Strategic Efforts** to negotiate tariff reductions with the U.S.

Systemic Concerns

If the situation is not addressed promptly, the long-term systemic impact could include:

1. **Loss of traditional craft skills** and know-how.
2. **Migration** of skilled artisans from rural areas.
3. **Weakening of rural employment systems.**
4. Decline in **foreign exchange earnings** for the country.

Conclusion and UPSC Relevance

The worsening situation in U.P.'s industrial clusters highlights the extreme **vulnerability** of India's labour-intensive export sectors to global trade shifts. A **timely support package** and proactive **market diversification** are essential to safeguard livelihoods and preserve India's traditional manufacturing base.

- **UPSC Relevance:**
 - **GS Paper 3:** Indian Economy, MSMEs, Trade Policy, Employment.
 - **GS Paper 2:** Policy Responses and Government Interventions.
 - **Current Affairs:** Analysis of global trade relations and export sector resilience.

2. SEBI's Caution on Unregulated 'Digital Gold'

- **SEBI's Stance: Unregulated and High Risk**
 - The Securities and Exchange Board of India (SEBI) has repeatedly cautioned investors against 'Digital Gold' or 'E-Gold' products offered on various online platforms, stating they are **neither notified as securities nor regulated as commodity derivatives**. They operate **entirely outside the purview of SEBI**.
 - **Risk Implication:** These products carry significant **counterparty and operational risks**. Critically, none of the **investor protection mechanisms** available under the securities market (like SEBI's grievance redressal) apply.



• Understanding Digital Gold

- **Definition:** Digital Gold is a virtual mechanism allowing one to buy, sell, and hold a corresponding quantity of physical gold (typically 24-carat, 99.9% purity) electronically, without physical storage hassle.
- **Mechanism:** Importers/vendors (e.g., MMTC-PAMP) procure and store the bullion in vaults, and distributors (fintech apps like PhonePe, Paytm) facilitate the purchase/sale, often in fractional amounts ($\text{₹}1$). Its rate is typically higher than the spot price due to GST and storage/platform charges.

• SEBI-Regulated Alternatives for Gold Investment

- SEBI directs investors towards regulated products that provide a legal safeguard and market transparency:
 1. **Gold Exchange Traded Funds (Gold ETFs):** Mutual fund schemes that invest in physical gold, traded on stock exchanges (requires a demat account).
 2. **Electronic Gold Receipts (EGRs):** Instruments representing ownership of dematerialised gold, tradeable on recognised stock exchanges.
 3. **Exchange-Traded Commodity Derivative Contracts:** Futures and options on gold traded on commodity exchanges.



• Statutory and Legal Context

- **Securities and Exchange Board of India Act, 1992:** Grants SEBI the power to protect investor interests and regulate the securities market. Digital Gold's non-inclusion as a 'security' places it outside this regulatory ambit.
- **Consumer Protection Act, 2019:** Investors' recourse in case of fraud or default by an unregulated platform would primarily fall under civil/criminal law or the Consumer Protection Act, which is often less effective than a dedicated market regulator's framework.

• Reasons for Digital Gold's Popularity & Surge

- The segment has seen massive growth (e.g., UPI purchases doubled by volume in the first nine months of the year) due to gold's strong performance (nearly 60% climb in rupee terms) and the product's **convenience, small-ticket size investment** (as low as $\text{₹}1$), and on-tap redemption.

Conclusion & UPSC Relevance

The controversy surrounding Digital Gold highlights a significant challenge in modern financial technology: the emergence of products in the **regulatory vacuum** between established bodies like SEBI and RBI. While offering ease of access, the lack of oversight exposes investors to unmitigated risks like custodian default (if the underlying gold is not securely or properly backed) and lack of formal grievance redressal.

UPSC Relevance: Useful for **GS Paper 3** (Indian Economy, Capital Market Regulation, Financial Sector Reforms, and Investor Protection) and **GS Paper 2** (Role of Statutory Bodies like SEBI, Government

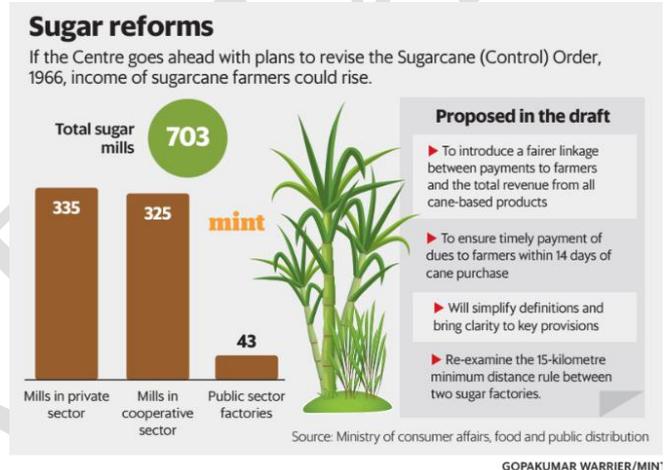


Policies and Interventions). This topic tests knowledge of the evolving financial landscape and the distinction between regulated and unregulated financial products.

3. Proposed Reforms to Sugarcane (Control) Order, 1966

• Modernizing FRP Calculation for Increased Farmer Income

- The government is reviewing the **Sugarcane (Control) Order, 1966**, to modernize outdated regulations.
- **Current Issue:** The existing order fixes the **Fair and Remunerative Price (FRP)** for sugarcane solely based on **sugar price**, ignoring diversified revenue streams.
- **Proposed Reform:** The FRP will be linked to the **total revenue** generated from **all cane-based products** (sugar, ethanol, electricity, molasses, bagasse, bio-CNG), which is expected to **increase the income of sugarcane farmers**.
- **Key Definition:** The **FRP** is the minimum price that sugar mills are legally required to pay to sugarcane farmers, fixed by the Central Government based on recommendations of the Commission for Agricultural Costs and Prices (CACP).



• Addressing Delayed Payments and Simplification

- The proposed draft mandates **quicker payment of dues** to farmers, requiring payment within **14 days** of cane purchase.
- The new order aims to **simplify definitions** and bring clarity to provisions, streamlining the regulations governing the ₹1.3-trillion sugar industry.

• Revisiting Restrictive Licensing Norms: The 15km Rule

- The proposal includes reviewing the **15-km minimum distance rule** between two sugar factories. This rule was initially intended to avoid competition when mills were few.
- **Impact of Removal:** Removing this outdated restriction would allow mills to **compete freely** for sugarcane, potentially leading to the setup of more mills closer to cane-growing areas, increasing efficiency.

• Extending Regulatory Ambit to the Cottage Industry

- The proposed amendment intends to **extend the ambit of government control** to the **cottage industry segment** of sugar, which includes units producing **gur, khandsari, and raw sugar**.
- **Rationale:** This move is aimed at leveling the playing field, as current khandsari units (consuming ~31% of total sugarcane) cannot compete effectively with sugar mills due to differences in efficiency and product diversity.

• Legal Framework and Constitutional Provision



- **Sugarcane (Control) Order, 1966:** Issued under the **Essential Commodities Act, 1955**, which empowers the Centre to fix cane prices, regulate production, and oversee the sale/movement of sugar.
- **Constitutional Angle:** The regulation of agriculture (including price fixation) often involves the **Concurrent List** (e.g., control of production, supply, and distribution of trade and commerce in essential commodities), justifying Central government intervention via the Essential Commodities Act.

Conclusion & UPSC Relevance

The review of the six-decade-old Sugarcane (Control) Order, 1966, represents a crucial step towards aligning regulatory mechanisms with the **diversified reality of the modern sugar industry**. By linking the FRP to total revenue and removing restrictive practices like the 15km rule, the reform has the potential to significantly enhance **farmer income**, improve industry **efficiency and global competitiveness**, and ensure greater **price stability** for consumers.

UPSC Relevance: Highly important for **GS Paper 3** (Indian Economy—Agricultural Subsidies, Minimum Support Prices, Food Processing Industry, and Government Policies for Farmers) and **GS Paper 2** (Statutory and Quasi-Judicial Bodies, Government Policies and Interventions). The topic is particularly relevant to agriculture-related current affairs and reforms.

4. Plunge in MGNREGA Demand: A Seasonal Trend

• Sharp Decline in MGNREGA Work Demand

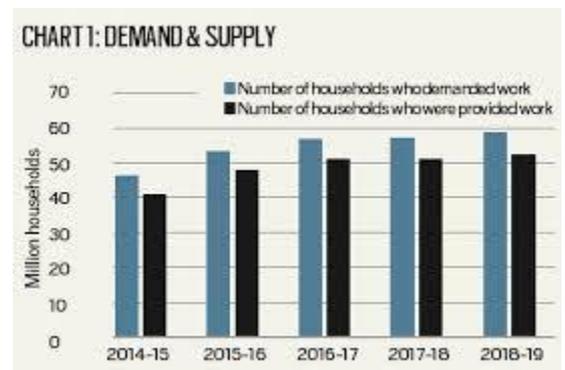
- Demand for work under the **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)** has seen a sharp, mid-year decline.
- Participation fell by nearly **two-thirds** (from \sim \$35.4 million persons in June to \sim \$12.8 million in October), marking one of the steepest declines in recent years, significantly higher than the previous year's drop (\sim \$42%).
- The most pronounced declines were observed in large states like **Andhra Pradesh, Bihar, Madhya Pradesh, and Uttar Pradesh**, which are major contributors to total MGNREGA employment.

• Key Reason: Monsoon and Revival of Farm Work

- The primary driver behind the decline is the onset of the **Monsoon season** (after July), which boosts **farm work** and related agricultural activities.
- This seasonal pick-up in agricultural labour naturally **absorbs much of the rural workforce**, leading to a reduced dependence on public job schemes like MGNREGA. Demand typically **peaks in May and June** (coinciding with the return of migrant workers and the North Indian summer) and then tapers off as farm work begins.

• Understanding MGNREGA and Its Role

- **Definition:** MGNREGA is one of India's largest social safety nets, guaranteeing **up to 100 days** of paid, unskilled work to any adult member of a rural household who demands it.





- **Function:** Demand for MGNREGA work serves as a **counter-cyclical indicator** for the rural economy. Demand generally **rises** when rural incomes weaken, non-farm employment opportunities shrink, or during periods of crisis (e.g., droughts, lockdowns), and **falls** when the economy (especially agriculture) is robust.
- **Constitutional and Legal Provisions**
 - **MGNREGA Act, 2005:** The scheme is legally mandated under this Act, which guarantees the "Right to Work" (limited to 100 days of unskilled manual work).
 - **Article 41 of the Constitution:** Relates to the **Directive Principles of State Policy (DPSP)**, which directs the State to make effective provision for securing the right to work, to education, and to public assistance in cases of unemployment, old age, sickness, and disablement. MGNREGA is a key statutory step towards fulfilling this DPSP.
- **Broader Economic and Policy Implications**
 - The current sharp decline, while seasonal, suggests a potentially **strong resurgence in primary sector employment** due to good monsoon conditions.
 - Policy analysis requires distinguishing between **cyclical/seasonal drops** (which are healthy indicators of agricultural revival) and **structural drops** (which could signal a long-term shift towards non-farm employment or rural prosperity).

Conclusion & UPSC Relevance

The temporary, sharp decline in MGNREGA job demand primarily reflects the **counter-cyclical role of the scheme** and the **seasonal absorption of labour by the agricultural sector** following the monsoon. This trend, while normal, underscores the continuing dependence of a large rural population on the health of the monsoon-fed farm economy. It demonstrates the scheme's effectiveness as a **demand-driven social safety net** that acts as an economic buffer in times of distress.

UPSC Relevance: Highly important for **GS Paper 3** (Indian Economy, Employment, Inclusive Growth, and Government Budgeting—as the scheme is a major expenditure item) and **GS Paper 2** (Welfare Schemes for Vulnerable Sections, Statutory Bodies, and Government Interventions). The topic requires understanding the mechanics of **demand-driven schemes** and the **labour market dynamics** in India's rural economy.

5. Deepening Economic Partnership: India's Push for CECA with Australia

- **Focus: Elevating Partnership from ECTA to CECA**
 - India and Australia are actively negotiating an "**ambitious and balanced**" **Comprehensive Economic Cooperation Agreement (CECA)**.
 - **Context:** This negotiation aims to expand the scope of the existing **Economic Cooperation and Trade Agreement (ECTA)**, which came into force in December **2022**.
 - **Key Definition:** The **ECTA** is a Free Trade Agreement (FTA) that primarily covers trade in goods and select services. The **CECA** is a more ambitious pact that integrates trade in goods, services, and investment, often including areas like Intellectual Property Rights (IPR), digital trade, and government procurement.
- **Broadening the Scope of Bilateral Trade**
 - The CECA negotiations cover a wide range of areas beyond the ECTA, including **Trade in Goods, Services, and Investment**.



- **Goal:** The ambitious target is to increase bilateral trade (which was \$24.1 billion in FY2025) to **AUD 100 billion by 2030**.
- **Existing Gains (under ECTA):** ECTA has already provided immediate **duty-free access** to a majority of Indian exports to Australia and opened opportunities in services, creating a solid foundation for the more comprehensive CECA.
- **Strategic and Geopolitical Alignment**
 - The trade deal is not just economic but also strategically important, deepening the collaboration between the two key **Indo-Pacific partners**.
 - **Alignment:** India-Australia relations are central to various plurilateral groupings and initiatives, including the **Quad** and the **Supply Chain Resilience Initiative (SCRI)**, aimed at creating diversified and resilient supply chains in the region.
- **Constitutional and Legal Provisions for Trade Deals**
 - **Parliamentary Supremacy:** In India, the **Parliament** has the power to legislate on matters concerning Foreign Affairs and implementing treaties.
 - **Article 253:** Empowers Parliament to make any law for the whole or any part of the territory of India for **implementing any treaty, agreement or convention** with any other country or countries, overriding the usual Union-State distribution of powers (Seventh Schedule, Union List Entry 14).
- **Key Areas of Expansion under CECA**
 - The expansion aims to provide greater certainty and market access by including areas such as: **digital trade**, addressing **non-tariff barriers**, **government procurement**, **Rules of Origin (RoO)**, and **Mutual Recognition Agreements (MRAs)** for professional qualifications.
 - *Additional Keypoint:* Australia is a key supplier of **critical minerals** and raw materials (like coal and metalliferous ores), which are vital for India's domestic manufacturing and energy security.



Conclusion & UPSC Relevance

The momentum from the ECTA towards a full CECA with Australia reflects India's post-RCEP strategy of pursuing **high-quality, deep, and balanced bilateral trade agreements** with strategically important nations. Achieving an early and comprehensive CECA is vital for India's goal of enhancing its **export competitiveness**, securing essential **raw material imports**, and solidifying its position in the **Indo-Pacific economic order**.

UPSC Relevance: Excellent for **GS Paper 2** (International Relations, Groupings and Agreements involving India) and **GS Paper 3** (Indian Economy, Foreign Trade, Investment Models, and Effect of Liberalization on the Economy). This topic illustrates India's current **trade policy shift** and the intersection of economics and geopolitics.



6. China Suspends Ban on Critical Mineral Exports to US

• Temporary De-escalation in Tech-Trade War

- China has suspended a specific ban on approving exports of "**dual-use items**" related to **gallium, germanium, antimony, and super-hard materials** to the US, effective until November 27, 2026.
- **Context:** This ban, originally announced in December 2024 (in response to US curbs on China's chip sector), was an aggressive use of China's dominance in **critical minerals** supply chains.
- **Geopolitical Signal:** The suspension follows recent high-level talks between Chinese President Xi Jinping and US President Donald Trump, signaling a temporary de-escalation of trade and tech tensions.

• Understanding Critical and Dual-Use Minerals

- **Gallium and Germanium:** Essential for **advanced semiconductors** (chips), **fiberoptic cables, LEDs, solar cells** (especially for space applications), and **high-end defense applications** (e.g., radar, infrared technology).
- **Antimony:** Used in **ammunition primers, flame retardants, and military shielding materials**.
- **Dual-Use Items:** Goods, software, and technology that can be used for both **civilian and military applications**. Controlling their export is a tool of national security and foreign policy.



• Controls Remain Despite Suspension

- The suspension **did not revoke** the earlier decision to add these three metals to China's **dual-use export control list**.
- **Implication:** Exporters will still need **licenses from Beijing** for foreign sales, meaning the supply remains under state control, just without the outright ban. Crucially, the ban on exports to **US military users or for military end-uses** remains in effect.

• Vulnerability of Global and Indian Supply Chains

- China controls a dominant share of global production and refining for these materials (e.g., $\sim 99\%$ of refined gallium). The initial ban created global shortages and pushed users to resort to expensive workarounds (like routing shipments through third countries).
- **India's Vulnerability:** India is heavily reliant on imports for these critical minerals, particularly **germanium** (100% import dependent), which is vital for its **Semiconductor Mission, electronics manufacturing, and strategic defense sector**. Disruptions expose supply chain vulnerabilities and increase input costs.

• India's Strategic Response

- India has been actively engaging with the Chinese government on these export restrictions, particularly regarding germanium.



- **Mitigation Strategy:** India is working to diversify its supply sources through international partnerships (e.g., **Minerals Security Partnership**) and by promoting **domestic exploration, processing, and recycling** through initiatives like the establishment of **KABIL (Khanij Bidesh India Limited)**.

Conclusion & UPSC Relevance

China's decision to temporarily suspend the export ban is a significant, yet conditional, pause in the global tech-trade conflict, providing immediate relief to supply chains reliant on these critical metals. However, the retention of licensing requirements underscores the long-term geopolitical weaponization of critical minerals. For countries like India, this incident highlights the imperative to achieve **strategic autonomy** in the supply of critical and dual-use minerals to safeguard ambitious domestic technological, economic, and defense goals.

UPSC Relevance: Essential for **GS Paper 3** (Indian Economy, S&T, National Security, and Critical Minerals Policy) and **GS Paper 2** (International Relations, Geopolitics, and Effect of Policies of Developed and Developing Countries on India's Interests). Key concepts like **dual-use technology, critical minerals, and export control regimes (SCOMET)** are directly relevant.

7. Global Bond Yields: Markets Flash Amber Warning

• The Disconnect: Rising Yields Despite Rate Cuts

- Long-term **bond yields** (which move **inversely** to bond prices) are rising globally, creating a significant disconnect from the expectations set by central banks (CBs).
- **Example:** In the US, the 30-year bond yield rose after the Federal Reserve cut its policy rate. Similarly, India's 10-year G-sec yield has remained elevated and volatile despite the Reserve Bank of India (**RBI**) cutting the repo rate by 100 basis points since February.
- **Impact on India:** This upward pressure, particularly on longer tenors, makes government borrowing more expensive and acts as a **dampener on investment and economic growth** by lifting the general level of interest rates across the economy.

• Underlying Drivers: Fiscal and Inflation Concerns

- The market is demanding a higher return (higher yield) to compensate for key risks:

1. **Inflation Persistence:** Investors are concerned that inflation may remain persistent, eroding the real value of future bond payments.

2. **Ballooning Public Debt/Fiscal Deficit:**

Increased government borrowing to fund large deficits increases the supply of bonds, which pushes prices down and yields up. Markets are acknowledging that **fiscal realities** are dominating monetary policy signals.

• Erosion of Central Bank Credibility

- The defiant market move suggests that investors have **lost faith** in the ability of central banks to keep interest rates low through monetary easing alone.





- **Shift in Power:** It signals a shift where **markets are setting their own agenda** and reading signals independently, rather than merely following central bank guidance, especially as CBs have become less explicit due to unpredictability.
- **Impact on the Yield Curve and Economic Cost**
 - **Yield Curve:** The phenomenon of greater increases in long-term yields than short-term yields leads to a **steepening of the yield curve** (or prevents it from flattening).
 - **Definition: Yield Curve:** A graph that plots the yields of bonds of the same credit quality (like government bonds) against their varying terms to maturity. Its shape reflects market expectations of future interest rates and economic growth. An upward shift across the curve increases the benchmark cost of borrowing for the entire economy.
- **Key Concept: The End of the 'Greenspan Put'**
 - The market action suggests the end of the famed '**Greenspan Put**' (and its successors).
 - **Definition: 'Greenspan Put':** A perceived monetary policy tendency, initiated by former Fed Chair Alan Greenspan, where the central bank would intervene (often by cutting rates and injecting liquidity) to prevent significant financial market declines. The current market defiance indicates that investors no longer rely on this implicit central bank insurance.

Conclusion & UPSC Relevance

The sustained global rise in long-term bond yields, despite central bank easing, is a critical market signal reflecting deep-seated concerns over **global debt sustainability** and **persistent inflation**. This environment challenges the effectiveness and credibility of traditional monetary policy tools. For India, this translates to higher sovereign borrowing costs and potential headwinds for domestic investment and growth, necessitating careful coordination between monetary policy (RBI) and fiscal policy (Government).

UPSC Relevance: Crucial for **GS Paper 3** (Indian Economy, Monetary Policy, Fiscal Policy, Debt Sustainability, and Capital Markets). The topic requires understanding the mechanics of **bond yields**, their **inverse relationship with bond prices**, and their role as a **leading economic indicator**.

8. Monetary Policy and the K-Shaped Economy

- **Definition: K-Shaped Economy/Recovery**
 - A K-shaped recovery occurs when, following a recession or economic shock, different parts of the economy or segments of the population recover at **vastly different rates and magnitudes**, resembling the two diverging arms of the letter 'K'.
 - **The Bifurcation:** The upper arm represents high-income individuals, large firms, and technology sectors that see strong growth, while the lower arm represents low-income consumers, small businesses, and struggling sectors that continue to decline or stagnate.
- **Monetary Policy as a Contributor to the K-Shape**
 - The Federal Reserve's (Fed) use of **restrictive interest rates** (rate hikes) is a **blunt tool** that unintentionally exacerbates this bifurcation.





- **Impact on Consumers:** Higher credit card interest rates (which move closely with the Fed Funds Rate) disproportionately affect **low-income consumers** and those who **carry a balance or have low credit scores**. These groups face increased interest payments and are forced to **cut their spending**, pulling down the bottom arm of the K. High-income consumers, who typically pay off their balances, remain largely unaffected and continue driving aggregate demand.
- **Divergent Impact on Business Investment**
 - The effects extend to the business sector:
 - **Top Arm:** Large, highly profitable firms (e.g., in AI/Tech) whose investments are funded internally or based on long-run expectations are largely **insensitive to high interest rates**.
 - **Bottom Arm:** Financially constrained firms, such as **young or small businesses** heavily reliant on **debt financing**, react more **strongly** to high financing costs, leading to depressed capital expenditure plans and reduced investment.
- **The Central Bank's Mandate and Limitation**
 - The US Fed operates under a "**Dual Mandate**" set by Congress: achieving **maximum employment** and **stable prices**. Monetary policy (interest rates) is applied to the economy as a whole to reduce overall demand and tame inflation.
 - **Limitation:** Interest rates are not a targeted tool like fiscal policy (tax-and-transfer). The Fed cannot selectively rein in high-end spending or shield low-income households, meaning its actions tend to slow the economy "**from the bottom up.**"
- **Conclusion: Feature and Bug of Restrictive Policy**
 - The K-shaped effect is viewed as both a necessary "feature" (it achieves the goal of cooling overall demand) and a "bug" (it exacerbates inequality) of restrictive monetary policy.
 - **Policy Signal:** The concentrated slowdown at the bottom of the economy, despite low aggregate unemployment, suggests that the policy may have achieved sufficient restriction, offering grounds for the Fed to consider a shift to less restrictive settings to promote a more even economic recovery.

Conclusion & UPSC Relevance

The analysis of the K-shaped economy demonstrates the profound distributional effects of **monetary policy**, a crucial dimension beyond its conventional aggregate targets of inflation and employment. While Central Banks (like the RBI in India) must prioritize price stability, this case highlights that policy choices have significant, often unequal, impacts on different household and business segments, directly influencing **income and wealth inequality**. Understanding these structural consequences is vital for policymakers and is a key concept for the Civil Services Exam.

9. Delayed Transparency in Air India AI 171 Crash Investigation

- **The Accident and Initial Facts**
 - On June 12, 2025, Air India flight AI 171 (a **Boeing 787 Dreamliner**) crashed shortly after take-off in Ahmedabad, Gujarat, resulting in 241 passenger fatalities (one survivor) and 19 ground casualties. This was the first crash of the Boeing 787 model.



- **Primary Cause Indication:** The preliminary report by the **Aircraft Accident Investigation Bureau (AAIB)** noted that the **No. 1 and No. 2 Fuel Control Switches transitioned to the 'Cut-off' position** in quick succession just after lift-off, starving both engines of fuel.
- **Lack of Transparency and Delayed Report Release**
 - The Ministry of Civil Aviation (MoCA), Government of India, has been criticised for **delaying the release of the final investigation report** (beyond the expected timeframe of 100 days for factual identification).
 - **Impact:** This delay has allowed **wild speculation and far-fetched theories** (e.g., electrical or software failure) to spread, harming the credibility of Indian aviation safety standards and causing undue stress to pilots.
- **Suspicious Circumstance: 'Threat Perception' and AAIB Chief Protection**
 - A significant and unprecedented event was the Ministry of Home Affairs (MHA) order providing the Chief of the AAIB with **'X Category Commando protection'** on a 24x7 basis, effective just three days after the first flight recorder was recovered.
 - **Implication:** The author suggests this action implies that MHA/MoCA were aware of sensitive facts contained in the flight recorders that are being shielded from the public, potentially related to crew actions or cockpit dynamics.
- **Key Technical Evidence from Flight Recorders (CVR/DFDR)**
 - **Cockpit Voice Recorder (CVR):** The immediate release of the CVR readout (a mere 1 minute 40 seconds) could settle speculation. Critical information includes the **mandatory "My Controls" and "Your Controls" calls** that should be made when a Captain takes over controls during a major emergency (like dual engine failure), and the recording of the **ambient sounds** of the physical movement of the spring-loaded fuel control switches.
 - **Digital Flight Data Recorder (DFDR):** This would confirm all control column movements, who was flying, and the exact sequence of the fuel switch movements.
- **International Standards and Safety Protocols**
 - **Contrast with International Practice:** Unlike the U.S. National Transportation Safety Board (NTSB) which releases relevant information with daily briefings, the Indian approach is characterised by long delays.
 - **Cardinal Rule of Flying:** In the event of a major emergency like dual engine failure on take-off, the Captain (**Pilot Monitoring**) must immediately take over control from the Co-pilot (**Pilot Flying**) by calling "My Controls," which must be responded to with "Your Controls." Failure to adhere to these procedures is a critical investigative factor.



Conclusion & UPSC Relevance

The Air India AI 171 crash investigation highlights the critical need for **transparency, timeliness, and adherence to international best practices** in air safety probes. The prolonged delay in releasing the final report, compounded by the unusual security provided to the lead investigator, threatens the credibility of



India's aviation safety regulatory structure. Upholding transparency is essential to prevent fear, counter misinformation, and ensure that lessons are learned and incorporated into standard operating procedures to enhance pilot training and air safety standards globally.

UPSC Relevance: Relevant for **GS Paper 3** (Internal Security—in the context of 'threat perception' and intelligence role; Infrastructure—Aviation Safety and Regulation) and **GS Paper 2** (Governance—Transparency, Accountability, and the Role of Investigative Agencies like the AAIB under the Ministry of Civil Aviation). The topic is a case study on **institutional integrity** and **crisis communication** in governance.

10. Functional Foods and Smart Proteins: India's Nutritional Future

• Defining the Nutritional Transformation

- **Functional Foods:** These are **enriched foods** designed to promote health or prevent disease, utilizing technologies like **nutrigenomics** and **bio-fortification**. *Example:* Zinc-enriched rice or omega-3 fortified milk.
- **Smart Proteins:** Proteins sourced via **biotechnology** to reduce reliance on conventional animal agriculture. They include:
 1. **Plant-based proteins** (mimicking meat/dairy from legumes/cereals).
 2. **Fermentation-derived proteins** (produced by microbial systems).
 3. **Cultivated meat** (animal cells grown in bioreactors).

• Need for Nutritional Security in India

- India's growing economy is shifting consumer demand from mere **food security** (filling stomachs) to **nutritional security** (providing food rich in protein, vitamins, and antioxidants).
- **The Challenge:** Over one-third of Indian children are **stunted**, and nutritional divides persist (e.g., between urban and rural populations). This transition must be achieved while balancing **sustainability goals** and mitigating environmental degradation.



• India's Current Ecosystem and Policy Support

- Functional foods and smart proteins are recognized under India's **Biotechnology for Economy, Environment, and Employment (BioE3)** policy.
- **Government Support:** The **Department of Biotechnology (DBT)** and the **Biotechnology Industry Research Assistance Council (BIRAC)** provide funding (e.g., substantial grant for cultivated meat research at CCMB).
- **Industry Growth:** The smart protein market is growing, with over 70 brands and 377 products in 2023, while large corporations (Tata, ITC) invest in fortified staples.



- **Crucial Regulatory and Policy Gaps**

- **Regulatory Void:** The biggest challenge is the **lack of regulatory clarity** from the **Food Safety and Standards Authority of India (FSSAI)** regarding **novel foods** such as cultivated meat and precision-fermented proteins.
- **Required Action:** A national regulatory framework is immediately needed for clear definitions, robust **safety evaluation**, and comprehensive **labelling** to prevent a flood of mislabelled or unverifiable products.

- **Economic Potential and Way Forward**

- The global plant-based food market is projected to be worth **\$\$\$85 billion to \$\$\$240 billion by 2030**. India, with its strong agricultural and biotech base, is positioned to become a major supplier, generating thousands of jobs.
- **Way Forward:** Requires **inter-ministerial coordination**, scaling up **biomanufacturing infrastructure** through public-private partnerships, **workforce upskilling**, and transparent **public education** to overcome skepticism about "lab-made" food.

Conclusion & UPSC Relevance

Functional foods and smart proteins represent the next frontier in India's agricultural and nutritional policy, moving the focus from quantity to **quality and sustainability**. While offering massive potential for addressing India's malnutrition and capturing a major share of the global bio-economy, success hinges entirely on the government's ability to establish a **clear, science-based regulatory framework** under FSSAI and gain **public trust** through transparent communication and farmer inclusion.

UPSC Relevance: Highly relevant for **GS Paper 3** (Indian Economy, Agriculture, Food Processing, Science and Technology, Biotechnology, and Environmental Conservation) and **GS Paper 2** (Government Policies and Interventions, Issues Relating to Health and Nutrition). The topic highlights the intersection of **Food Security, Nutrition, Sustainability, and Industrial Policy**.
