

● POLITY

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SCIENCE AND TECHNOLOGY

IMMORTAL CELL LINE AND REPARATION

CONTEXT: Thermo Fisher compensates Henrietta Lacks' family for unacknowledged use of her cells in medical research.

Cell culture

Cell culture involves growing and maintaining cells outside their natural environment, providing insights into cellular behavior, disease mechanisms, and drug responses.

- **Facts:** Cells are cultured in controlled conditions like temperature and nutrient supply. It aids in studying cell biology, genetics, and disease pathways.
- **Technical Aspects:** Cells are cultivated in sterile containers with specific growth mediums. Techniques include adherent (attached) and suspension (floating) cultures, supporting various cell types and research goals.
- **Applications:** Cell culture is vital in drug testing, disease modeling, vaccine production, and regenerative medicine research. It enables studying cancer, infections, and neurological disorders.
- **Research Impact:** Cell culture contributes to understanding cellular processes, enabling advancements in biotechnology, medical research, and personalized medicine.

Excerpts from "An immortal cell line and reparation, 70 years later, 11th August 2023"

ECONOMICS AND DEVELOPMENT

MONETARY POLICY STATUS QUO

CONTEXT: The RBI's Monetary Policy Committee (MPC) kept policy rate unchanged, despite an upward revision in its CPI-inflation projections for the current fiscal from 5.1 % to 5.4 % and headline inflation projection for the July-September quarter from 5.2 % to 6.2 % fuelled by food inflations.

Such frequently recurring food price shocks risk destabilise inflation expectations. The RBI temporarily imposed an incremental 10 % increase in the cash reserve ratio to drain a portion of the surplus liquidity in the banking system that spur prices. The MPC has not only retained its forecast for the GDP to expand by 6.5 % in real terms in 2023-24 but also stuck by its June projections for growth in each of the four quarters, the inflation shock notwithstanding. The MPC has flagged several risks to the inflation outlook: the uneven rainfall distribution this year, the recent uptick in crude oil prices (the average price of the Indian basket has so far risen by 7 % sequentially this quarter), and enterprises polled by the RBI expect output prices to harden.

SCIENCE AND TECHNOLOGY

SOFT LANDING OF CHANDRAYAAN-3

CONTEXT: : ISRO unveils Chandrayaan-3's Earth image at launch and Moon image after Lunar Orbit Insertion.

BACKGROUND: ISRO shared Chandrayaan-3 mission updates. Earth imaged by LI camera at launch, Moon by LHVC after Lunar Orbit Insertion. Cameras developed by centers in Ahmedabad and Bengaluru. Earlier, video of Moon during Lunar Orbit Insertion on August 1 was released. Soft landing on the Moon anticipated.

SPACE SITUATION SO FAR: ISRO evaluates moon's space dynamics ahead of Chandrayaan-3's lunar landing on August 23. Moon and Mars are extensively explored and populated. Upcoming lunar activities driven by Artemis missions and Mars colonization. Diverse interests, including commercial resource utilization, raise the need for orbital threat mitigation. Six active lunar orbiters, repurposed probes like ARTEMIS P1/P2, NASA's LRO, Chandrayaan-2, and KPLO operate in polar orbits. Defunct craft include Japan's Ouna and ISRO's Chandrayaan-1.

**Soft Landing on the Moon**

Soft landing on the Moon refers to a spacecraft's careful descent, using engines and maneuvers, to ensure a gentle touchdown on the lunar surface.

- **Avoiding Impact:** The goal is to prevent any damaging impact that could harm the spacecraft or disturb the Moon's terrain.
- **Precision Engineering:** Advanced navigation and propulsion systems are employed to achieve a precise landing location and minimize landing speed.
- **Minimizing Vibrations:** By managing descent speed and engine thrust, the landing craft aims to reduce vibrations that could affect delicate scientific instruments.
- **Safe Operations:** Soft landings enable scientific exploration and data collection while maintaining the spacecraft's structural integrity, enhancing the chances of mission success.

Excerpts from "The Hindu - ISRO gears up for soft landing of Chandrayaan-3, 11th August 2023"

ECOLOGY AND ENVIRONMENT

ALL INDIA TIGER ESTIMATION -2022

CONTEXT: Detailed report on All India Tiger Estimation 2022 released on Global Tiger Day at Corbett Reserve.

HIGHLIGHTS: Madhya Pradesh's Wildlife Institute and Tiger Conservation Authority updated tiger census, reporting 785 tigers, a 50% increase. Bihar also shows growth despite having fewer tigers. Madhya Pradesh's success attributed to skillful predator-prey balance achieved through relocating tigers and prey to maintain a harmonious population.

Madhya Pradesh's conservation efforts include relocating species and translocating prey for carnivores. Recent amendments to forest laws pose challenges, potentially leading to fragmented habitats. India's conservation philosophy seeks harmonious coexistence with humans. Increasing habitat connectivity and involving communities are crucial. Shifting focus from carnivore numbers to sustained habitat improvement is essential for effective conservation.

DEVELOPMENTS SO FAR: In 1973, India initiated Project Tiger to conserve tigers and biodiversity. It expanded from 9 reserves covering 18,278 km² to 53 reserves spanning 75,796 km², protecting 2.3% of India's land.

- **Tiger Population Dominance:** India hosts nearly 75% of the global wild tiger population, a significant conservation responsibility.
- **Two Phases of Conservation:** Phase 1 (1970s) established protected zones and the Wildlife Protection Act. Phase 2 (2005) embraced community involvement, technology-driven monitoring, law enforcement, and landscape-level strategies, yielding positive outcomes.
- **Population Growth:** Tiger sightings rose from 2461 (2018) to 3080 (2022), with over 3/4th of tigers now thriving within protected areas.
- **Population Estimate:** Prime Minister Modi announced a minimum tiger count of 3167 in 2022, while subsequent analysis suggested an upper limit of 3925 and an average of 3682 tigers, indicating a notable annual growth rate of 6.1%.

Excerpts from "Needed intervention -Improving the habitat that sustains tigers is key to increasing their numbers, 11th August 2023"

ECONOMICS AND DEVELOPMENT

FEDERAL FUND RATE HIKES

CONTEXT: The recently concluded Federal Open Market Committee meeting on July 26, 2023 raised the targeted federal funds rate from 5.25 % to 5.5 %, surpassing the levels seen in 2001. The hike was aimed at reducing inflation to 2 %.

The Federal Funds Rate plays a crucial role in the economy as it determines lending rates among banks. The Federal Reserve intervenes in the market through bond purchases or sales to maintain the targeted rate range.

The Federal Funds Rate were near zero from 2008 (onset of the global financial crisis) until 2015. The Federal Funds Rate dropped to 0.05 % with the pandemic. Since March 2022, there has been a steady increase in the rate.

Large-scale expansion of the balance sheets of the Central Banks of Advanced Countries since the global financial crisis reduced interest rates to abysmally low levels facilitated carry trade. Agents borrow in dollars and invest in emerging markets to benefit from interest margins due to the higher interest in developing countries. The external debt stocks in low and middle-income countries doubled, reaching 181.1 % of their GDP between 2011 and 2016 to exceed 200 % of their GDP by 2020.

In the developing world, non-financial corporations took advantage of low global interest rates to borrow cheaply. Approximately \$5.14 trillion of the total outstanding dollar debt of \$13 trillion held by non-financial corporations outside the U.S. is from emerging markets and developing economies. With rising interest rates and currency depreciation, unhedged dollar debts could pose serious problems for these corporations.

As interest rates in advanced countries rise, foreign investors may abandon government securities in developing economies, leading to currency depreciation and increased borrowing costs. This situation exacerbates debt servicing concerns for developing countries.

The World Bank's recent debt report reveals that the poorest countries borrowing through the International Development Association (IDA) spend 10 % of export earnings on servicing debt, the highest since 2000.

"Learning is not attained by chance; it must be sought for with ardor and diligence."— Abigail Adams.



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ECONOMICS AND DEVELOPMENT

CHINA'S DEFLATION

CONTEXT: China is experiencing deflation at a time when the People's Bank of China continues to keep interest rates low to boost demand in the economy, sharp contrast to other central banks which have been tightening policy to fight high inflation after the Covid-19 pandemic.

Consumer prices in China declined for the first time in over two years in July with consumer price index declining by 0.3 % in July from a year earlier. Producer prices also dropped for the 10th consecutive month, contracting 4.4 % in July. The property sector which contributes to a major share of Chinese GDP has been experiencing turmoil even before the pandemic.

Deflation is a sign of falling demand for goods and services, the driver of economic growth which could lead to a slowdown in economic growth. Falling prices, can also push buyers to postpone their purchases expecting lower prices in the future; further dampening demand in the economy. A certain degree of inflation is believed to be necessary for the full

utilisation of the resources in an economy. Deflation can lead to business losses and lower growth as costs remain sticky. It can also mess up credit contracts as borrowers will have to pay back lenders more in real terms.

Even a country like Japan, which has been plagued by persistent deflation for years, actually witnessed a rise in per capita real income levels during the era of deflation. Deflation in such cases is the result of a rise in the supply of goods and services that outpaces the rate of money supply growth. Deflation can also be a sign of economic turmoil.

June projections for growth in each of the four quarters, the inflation shock notwithstanding. The MPC has flagged several risks to the inflation outlook: the uneven rainfall distribution this year, the recent uptick in crude oil prices (the average price of the Indian basket has so far risen by 7 % sequentially this quarter), and enterprises polled by the RBI expect output prices to harden.



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