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GS 2: POLITY, GOVERNANCE, SOCIAL JUSTICE, INTERNATIONAL RELATIONS/INSTITUTIONS

1. Surge to slowdown: 38% fall in US student visas issued to Indians in Jan-Sept

Context: After driving the post-pandemic rebound in international student numbers on American campuses, India is now seeing a sharp downturn, with US state Department data showing a 38% drop in F-1 student visas issued to Indians in the first nine months of 2024 as compared to the same period last year. From January to September this year, 64,008 visas were issued which is very large-scale decline from 1,03,495 in the same months of 2023. Data shows that 65,235 visas were issued during the same period in 2021 and 93,181 in 2022.

Key points

- **Overview:** The F-1 visa is a non-immigrant category for students attending academic institutions in the US, while the M-1 visa covers vocational and non-academic programmes. The drop in F-1

issuances to Indian students assumes significance against the backdrop of milestones achieved by Indians.

- **Milestones achieved: India has overtaken China**, which now has 277,398 students, as the leading country of origin for international students in the US. **Indian students lead in graduate enrolments (master's and PhD levels)** for the second consecutive year, with a 19% increase to reach 196,567 students.
- **Other accomplishments:** The total number of international students in the US reached 1,126,690 for the 2023-24 academic year, reflecting a 7% increase from the previous year. The primary funding sources for international students include personal and family funds (54.5%), current employment (21.8%), and US college or university funding (19.0%).
- **Initiative Taken by Indian Government:** Education Services & Internationalization of Higher Education (ES-IHE)-Champion Services Sector Scheme (CSSS). Scheme for Promotion of Academic and Research Collaboration (SPARC), etc.
- **Scheme for Promotion of Academic and Research Collaboration (SPARC):** SPARC aims at improving the research ecosystem of India's higher educational institutions by facilitating academic and research collaborations between Indian institutions and the best institutions in the world from 28 selected nations to jointly solve problems of national and international relevance in the first phase.
    - *Thrust Areas* - A set of 5 Thrust Areas which are Fundamental Research, Emergent Areas of Impact, Convergence, Action-Oriented Research, and Innovation-Driven and sub-theme areas in each thrust area has been identified. A set of Nodal Institutions (NI), from India, for each participating foreign country has been identified.
    - *Expected Outcomes of SPARC* - Enable long-term stay for international faculty, this simultaneously helps in academic interactions, research collaborations, niche course development. Enable many Indian students to be trained in high-end experimental facilities available in the best laboratories in the world.

GS 2: POLITY, GOVERNANCE, SOCIAL JUSTICE, INTERNATIONAL RELATIONS/INSTITUTIONS

2. Death by water

Context: As policymakers prioritise universal access to potable water, the death of three persons last week in Chennai due to suspected consumption of contaminated piped water is a reminder that coverage is not the only problem: even urban centres with a long history of piped supply are still not assured of potable water that is free from dangerous contamination. Irrespective of the cause, it is concerning that severe contamination of water continues to occur with greater periodicity in cities in India. Data from the Jal Shakti Ministry show that arsenic has been detected in groundwater in parts of 230 districts in 25 States and fluoride in 469 districts in 27 States.

Key points

- **Overview:** The National Green Tribunal (NGT) recently expressed dissatisfaction over the Central Groundwater Authority's (CGWA) response to the widespread issue of toxic arsenic and fluoride in groundwater across India.
- **Sources of Groundwater Contamination:** *Naturally Occurring Contaminants* - High levels of arsenic, fluoride, iron, and uranium exist naturally in some geological formations, contaminating groundwater.

Agriculture - Excessive use of fertilisers, pesticides, and herbicides leach harmful chemicals into the water table.

Industrial Waste - Untreated industrial effluents often find their way into groundwater sources, introducing heavy metals and other toxins.

Urbanisation - Leaky sewage systems and improper waste disposal in urban areas contribute to groundwater pollution.

Saltwater Intrusion - In coastal areas, over-pumping of groundwater can cause saltwater from the ocean to infiltrate freshwater aquifers, rendering the water unusable for drinking or irrigation.

- **Agents Responsible for Contamination:** *Arsenic* - While arsenic occurs naturally, it is also present in human-made forms used in agriculture, mining, and manufacturing.

  Fluoride - In India, fluorosis is a prevalent issue due to the consumption of water with high fluoride content.

  Nitrates - Excessive nitrate levels in drinking water react with haemoglobin, forming non-functional methaemoglobin and hindering oxygen transport, leading to methemoglobinemia and blue baby syndrome.

  Uranium - Uranium, weak radioactive with a long physical half-life, is found in concentrations above WHO guidelines in localised pockets in India.

  Radon - Recently, in some areas of Bengaluru, groundwater used for drinking has been found to contain significantly high levels of radioactive radon.

  Other Trace Metals - Water may also be contaminated by trace metals such as lead, mercury, cadmium, copper, chromium, and nickel, which possess carcinogenic properties.
- **Current Government Initiatives:** Atal Bhujal Yojana, Jal Shakti Abhiyan, Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), etc
- **Way Forward:** *Strengthening Groundwater Regulation* - Enforcing stricter regulations on industrial waste disposal and agricultural practices.

  Promoting Sustainable Agriculture - Provide subsidies and training for farmers to adopt precision agriculture techniques, careful utilisation of fertilizers, and efficient irrigation practices like drip irrigation.

  Investing in Infrastructure - Increasing investment in building and maintaining wastewater treatment plants to prevent untreated sewage from contaminating groundwater.

  Decentralised Management - Empowering local communities by fostering participatory water management models. This can involve forming Water User Associations (WUAs) for planning, monitoring, and regulating groundwater extraction in localized areas.

  Blue Credit - Offering financial incentives like Blue Credit for rainwater harvesting, greywater recycling, and adoption of water-saving technologies in domestic and industrial sectors.

  Utilising Artificial Intelligence (AI) - Leveraging AI to analyse vast sets of data on water quality, usage patterns, and aquifer characteristics. This can help predict contamination risks and develop targeted interventions.

Q. What are the salient features of the Jal Shakti Abhiyan launched by the Government of India for water conservation and water security? (জল সংৰক্ষণ আৰু জল সুৰক্ষাৰ বাবে ভাৰত চৰকাৰে আৰম্ভ কৰা জল শক্তি অভিযানৰ মুখ্য বৈশিষ্ট্যসমূহ কি কি?)

GS 3: ECONOMY, ECOLOGY, SCIENCE & TECHNOLOGY, DEFENCE, SECURITY AND DISASTER

3. Study brings Indian star tortoise to evidence-based conservation

Context: The Indian star tortoise (Geochelone elegans) is a sight to behold, with its obsidian shell and the striking sun-yellow star patterns adorning it. These tortoises are hardy herbivores and are popular as exotic house pets. It's illegal to own one in India but also unethical since they are vulnerable in the wild. Endemic to the subcontinent, Indian star tortoises reside in arid pockets of northwest India (bordering Pakistan), South India, and Sri Lanka. The Indian star tortoise is listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and in Schedule I of the Wildlife (Protection) Act 1972.

Key points

- **Overview:** A recent study on the Indian star tortoise distributed across South Asia has revealed that the genetic diversity of the species as well as its habitat has suffered major losses because of rampant illegal trade.
- **Recent study:** The research report said the species is facing twin challenges of a threat to its habitat at one level and loss of its genetic diversity at the other. It calls for a proper conservation strategy to combat the fragmented distribution and explicitly recommends intensive genetic screening of founder individuals or isolated adult colonies by implementing scientific breeding.
- **Indian Star Tortoise:** Millions of years ago, Geochelone, the group that includes the Indian star tortoise, spread across the Indian subcontinent after the latter split from the Gondwana supercontinent and collided with Eurasia. Indian star tortoise is found in the central and Southern parts of India, in West Pakistan and Sri Lanka.
  Threat - The highly fragmented habitat of the species, is greatly influenced by an increased level of urbanisation and agricultural practices throughout its range.
  Conservation Efforts - At the 18th Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES CoP18) held in 2019, Indian Star Tortoise was up-listed to Appendix I from Appendix II owing to its over-exploitation.
- **CITES:** The Convention on International Trade in Endangered Species of Wild Fauna and Flora is an international agreement between governments. It aims to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species.

GS 3: ECONOMY, ECOLOGY, SCIENCE & TECHNOLOGY, DEFENCE, SECURITY AND DISASTER

4. The issue of India's economic growth versus emissions

Context: The Indian economy has consistently showcased its robust growth over the past few decades. But higher economic growth is believed to have come with increasing environmental pressure, notably through higher greenhouse gas (GHG) emissions. However, India's Economic Survey (2023-24) claims that India has decoupled its economic growth from GHG emissions, as between 2005 and 2019, India's GDP grew at a compound annual growth rate (CAGR) of 7%, while emissions rose at a CAGR of just 4%.

Key points

- **Overview:** According to the Economic Survey 2023-24, inflationary pressures, driven by global issues, supply chain disruptions, and unpredictable monsoons, have been effectively managed through strategic administrative and monetary policies. Consequently, retail inflation, which averaged 6.7% in FY23, decreased to 5.4% in FY24. The report further noted that the government's timely policy interventions, combined with the Reserve Bank of India's measures to ensure price

stability, successfully kept retail inflation at 5.4% in FY24, marking the lowest level since the pandemic.

- **Economic Survey 2023-24:** *Resilient Economy* - The Indian economy grew over 7% for the third consecutive year, driven by stable consumption and improving investment demand.
  Improved Current Account Deficit: India's CAD improved to 0.7% of GDP in FY24, down from 2.0% in FY23.
  Robust Forex Reserves - At the end of March 2024, India's forex reserves could cover more than 10 months of projected imports and 98% of external debt.
  Stable Banking Sector - The banking sector showcased stellar performance with double-digit credit growth, low NPAs, and improved asset quality.
  Core Inflation Falls - Retail inflation was maintained at 5.4%, the lowest since the pandemic, due to effective policy interventions and RBI measures.
  Positive Short-Term Inflation Outlook - Inflation is expected to decline to 4.5% in FY25 and 4.1% in FY26, assuming normal monsoon and no external shocks.
  Growth Strategy for New India - The focus will be on bottom-up reforms, job and skill creation, MSME development, green transition, and addressing inequality.
  FDI Inflows Slow - Net FDI inflows declined from $42 billion in FY23 to $26.5 billion in FY24, with gross FDI inflows moderating slightly.
  Growing Energy Needs - India's energy needs are projected to grow 2 to 2.5 times by 2047, with significant progress in renewable energy and emissions reduction.
  Sectoral Performance - Agriculture grew at 4.18% annually over the past five years, industry grew at 9.5% in FY24, and the services sector contributed 55% to the economy in FY24.
- **Decoupling economic growth:** It is the process of growing an economy without increasing environmental pressure. It involves reducing the number of resources used to generate economic growth, while also decreasing environmental deterioration and ecological scarcity.
  Measurement - Decoupling is often measured by the emission intensity of economic output.
  Relative decoupling - This happens when both GDP and emissions grow, but the rate of GDP growth is faster than the rate of emissions growth.
  Absolute decoupling – It occurs when the economy grows, while emissions decrease. This is the ideal form of decoupling, where countries grow economically without increasing environmental harm.
- **Way forward:** Easy financing instruments need to be explored by banking and non-banking financial institutions for promoting investment in formal recycling setups. A cluster-based approach could be considered by bringing different players. Achieving this decoupling will help to achieve, global commitment to sustainable development by 2030.

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5. India to set up anti-drone unit for border security

Context: The initial results of a "laser equipped anti-drone gun-mounted" mechanism have been encouraging which has led to an increase in drone neutralisation and detection cases, up from 3 per cent to 55 per cent, along the India-Pakistan border in Punjab. According to official data, more than 260 drones have been downed or recovered from India's border with Pakistan this year as compared to about 110 in 2023. The maximum number of such interdictions of drones carrying arms and drugs have taken place in Punjab and very few in Rajasthan and Jammu. The ongoing Comprehensive Integrated Border

Management System (CIBMS) for securing India's borders with Pakistan (2,289 km) and Bangladesh (4,096 km) is a work in progress.

Key points

- **Overview:** For effective border management, several initiatives have been undertaken by the Border Management Division of the Ministry of Home Affairs including the construction of fences, floodlighting, roads, Border outposts, deployment of technological solutions and measures for border area development.
- **Initiatives Taken for Border Management:** India's border management strategy has four main elements which are border guarding, border regulation, development of border areas, and bilateral institutional mechanisms.
  Comprehensive Integrated Border Management System (CIBMS) - It is the integration of manpower, sensors, networks, intelligence, and command control solutions to improve situational awareness to facilitate quick response. It is implemented along parts of the India-Pakistan and India-Bangladesh Border.
  Integrated check posts (ICPs) - An ICP houses all related regulatory agencies, such as border guarding forces, customs, and immigration, as well as support services such as state-of-the-art scanning and detection devices, foreign exchange bureau, banking, parking, passenger facilitation area and a cargo area.
  Border Area Development Programme (BADP) - This aims to meet the special development needs of the people living near the International Boundary through the convergence of BADS/ Central/ State/ UT/ Local schemes.
    - *Village Defence Committees* - Locals can be trained and incentivized to form VDCs to report illegal activities and infiltration.

  Vibrant Villages Programme - This is part of the border area development strategy where over 100 villages will be developed along the LAC.
- **Counter-Drone Technology Development:** DRDO has developed a comprehensive anti-drone system encompassing detection, identification, and neutralization of drones. The technology is capable of countering attacks, soft kill and hard kill of all types of drones, including micro drones. Also, the technology has been transferred to private companies like BEL, L&T, and Icom for mass production
- **UAV Development:** *Tapas MALE UAV* - The Tapas Medium Altitude Long Endurance (MALE) UAV developed for Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR) applications is in an advanced stage of developmental trials.
  Archer UAV - Short-range armed UAV Archer is under development for reconnaissance, surveillance, and low-intensity conflict scenarios, with developmental flight trials in progress.

Q. What is "Terminal High Altitude Area Defense (THAAD)", sometimes seen in the news?

(a) An Israeli radar system

(b) India's indigenous anti-missile programme

(c) An American anti-missile system

(d) A defence collaboration between Japan and South Korea