

#RiseWithRICE

A large, golden-brown statue of a lion capital, likely the Lion Capital of Ashoka, is positioned in the background. The statue features four lion heads facing different directions, with a central wheel-like motif. The background is a solid red color.

Expected EDITORIAL EXPLAINED

for

IAS Mains Examination

21st Sep *to* 26th Sep 2026



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GENERAL STUDIES 2

1.1. POLITY & GOVERNANCE

1.1.1. THE FCRA AMENDMENT BILL 2026: REGULATING FOREIGN AID AND CIVIL SOCIETY

Context

The proposed **Foreign Contribution (Regulation) Amendment Bill, 2026** mandates immediate state vesting of NGO assets upon registration cancellation. This legislative tightening coincides with the voluntary withdrawal of international donors, shifting the survival burden onto India's emerging **domestic philanthropy** sector.



Introduction

Enacted in 1976 to shield domestic institutions from **foreign destabilisation**, the **FCRA** faces a modern overhaul to curb allegedly opaque financial networks. This stringent regulatory approach raises acute concerns over balancing strict **national security** measures with the uninterrupted delivery of vital **grassroots welfare services**.

What Does the FCRA Amendment Bill 2026 Propose?

1. **Vesting on Cancellation:** All **foreign contributions** and created assets immediately vest in a government **designated authority** upon certificate cancellation, surrender, or lapse.
2. **Provisional vs. Permanent Vesting:** Assets are returned if registration is restored within a prescribed period; otherwise, they undergo **permanent government vesting**.
3. **Asset Liquidation:** Unrestored assets may be sold or transferred, with proceeds credited directly to the **Consolidated Fund of India**.
4. **Statutory Remedies:** Provides a formal legal recourse mechanism via explicit **appeals to the District Judge**.

Why Are Tighter Controls Being Proposed?

1. **Opaque Financial Channels:** The government flags thousands of crores in unmonitored capital entering under the guise of **social welfare**.
2. **Bypassing State Oversight:** Significant capital inflows deliberately evade official **state accounting mechanisms** and fiscal scrutiny.
3. **Targeted Diversion:** Intelligence suggests funds are redirected toward **politically charged advocacy**, selective protests, and aggressive **religious conversion networks**.

Significance of the Foreign Funding Debate

1. **Safeguarding National Security:** Precludes adverse foreign powers from using unaccounted capital to influence **domestic policy** and political stability.

2. **Operational Flexibility:** Foreign aid offers crucial **flexible operational expenditure** that is tailored directly to specific local NGO needs.
3. **Frontline Welfare:** Sustains non-profit schools, hospitals, and care homes that function as **sole service providers** in remote tribal regions.
4. **Mobilising Domestic Philanthropy:** Promotes indigenous alternative funding, with mandatory corporate **CSR spending** reaching ₹22,563 crore in FY25.

Challenges to the FCRA Amendment Bill, 2026

1. **Vesting Precedes Adjudication:** Immediate asset confiscation occurs prior to the judicial hearing of statutory appeals by the **District Judge**.
2. **Disruption of Essential Services:** Abrupt takeovers force clinics and schools to halt operations, penalizing **vulnerable beneficiaries** before culpability is established.
3. **Irreversibility of Liquidated Funds:** Sale proceeds entering the **Consolidated Fund of India** cannot be refunded administratively, even if registration is eventually restored.
4. **Domestic Philanthropy Mismatch:** Expanding domestic donors and tech philanthropists disproportionately prioritize **higher education and ecosystem building**, starving traditional grassroots welfare.

Way Forward

1. **Suspend Premature Vesting:** Defer the vesting of assets until statutory appeals are fully adjudicated, utilizing an **interim court-appointed receiver** in the interim.
2. **Ring-Fence Frontline Assets:** Allow district administrations to temporarily manage operational schools and clinics to prevent the shutdown of **essential public services**.
3. **Dedicated Escrow Accounts:** Retain asset liquidation proceeds in independent **escrow mechanisms** outside the Consolidated Fund until judicial finality is reached.
4. **Permit Regulated Sub-Granting:** Reintroduce structured, traceable sub-granting frameworks under a **light-touch regulatory regime** to support small grassroots bodies.
5. **Channel CSR to Traditional Welfare:** Formulate policy incentives encouraging corporate donors to deploy **CSR capital** into basic rural healthcare, primary education, and disability care.

Conclusion

Balancing **national sovereignty** with a vibrant civil society requires institutional safeguards that strictly preserve the operational autonomy of genuine non-profit entities. As global capital recedes, fostering an enabling and flexible **domestic philanthropy** ecosystem is crucial to sustain India's vital **grassroots developmental architecture**.

Q. Examine critically the recent changes in the rule governing foreign funding of NGOs under the Foreign Contribution (Regulation) Act (FCRA), 1976. 15 Marks 2015

1.2. INTERNATIONAL RELATIONS

1.2.1. FROM PRIVILEGE TO RESPONSIBILITY: REFORMING THE UNSC VETO ARCHITECTURE

Context

At the UN General Assembly, France and Mexico renewed their initiative to regulate the UN Security Council (UNSC) veto during mass atrocities, framing its use as an institutional "responsibility" rather than an absolute "privilege."

Introduction

Geopolitical rivalries among permanent members frequently paralyze the UN Security Council during severe humanitarian emergencies. The renewed push for voluntary veto restraint offers a pragmatic mechanism for institutional discipline, bypassing the near-impossible legal task of formally amending the UN Charter.



The French-Mexican Initiative on Veto Restraint

- **Core Commitment:** Launched in 2015, it urges the P5 to voluntarily abstain from vetoing resolutions addressing genocide, crimes against humanity, and war crimes.
- **Charter-Bypassing:** Operates as an exercise in political self-restraint rather than a formal UN Charter amendment.
- **Growing Support:** Endorsed by 128 member states, including the UK, meaning two permanent members now formally support the principle.

Core Dimensions of the Veto Debate

- **Usage:** The foundational decision of whether to exercise the negative vote.
- **Accountability:** Requiring a state to publicly justify its veto before the international community.
- **Structural Reform:** Expanding membership categories and altering overall decision-making rules.

The Syrian Deadlock as a Reform Catalyst

- **Institutional Paralysis:** Persistent Russian and Chinese vetoes during the Syrian civil war paralyzed collective humanitarian intervention.
- **The Ghouta Trigger:** Following the 2013 Ghouta chemical attack, France proposed a code of conduct for P5 voluntary restraint during mass atrocities.

Alternative Accountability Mechanisms

- **Liechtenstein Initiative (2022):** Mandates a UNGA debate within 10 days of a veto, forcing the casting state to publicly defend its decision on the Assembly floor.
- **ACT Code of Conduct:** Urges all Security Council members (permanent and elected) to pledge against blocking credible humanitarian interventions.

Realpolitik and the Amendment Barrier

- **Textual Origin:** The word "veto" is absent from the Charter; it stems from Article 27(3) requiring the concurring votes of permanent members.
- **Amendment Hurdle:** Formal abolition under Article 108 requires a two-thirds UNGA majority and ratification by all P5 members.
- **Survival Constraint:** International organizations historically struggle to survive if they enforce decisions contradicting the core strategic interests of major global powers.

India's Stance on UNSC Reform

- **Group of Four (G4):** Coordinates with Brazil, Germany, and Japan to advance joint bids for permanent seats.
- **L.69 Coalition:** Aligns with developing nations from the Global South to demand comprehensive expansion across both categories.
- **Text-Based Negotiations:** Advocates shifting UN talks to a single consolidated text to achieve tangible outcomes.

Significance of Regulating the Veto

- **Alleviating Paralysis:** Enables urgent interventions and aid delivery in crisis zones like Sudan, Lebanon, and Gaza.
- **Normative Shift:** Redefines the veto from an unconditional sovereign entitlement into an accountable governance duty.
- **Feasible Alternative:** Achieves functional reform without triggering rigid Charter amendment barriers.
- **Global South Empowerment:** Mobilizes broad multilateral coalitions to exert moral and political pressure on major powers.

Challenges in Disciplining the Veto

- **No Legal Enforcement:** Voluntary declarations cannot legally bind states acting on overriding national interests.
- **Subjective Classification:** The Security Council lacks an objective mechanism to universally designate "mass atrocities."
- **Unenforceable Debates:** UNGA post-veto resolutions carry moral weight but lack enforcement teeth under Chapter VII.
- **Hegemonic Resistance:** Major powers consistently refuse to dilute an instrument central to their strategic defense.

Strategic Way Forward

- **Mandate Written Justifications:** Require formal written rationales in official UNSC records for any veto cast during a humanitarian crisis.
- **Independent Determinations:** Route atrocity classifications to independent bodies like the UN High Commissioner for Human Rights or the ICJ.

- **Actionable UNGA Follow-ups:** Pair mandatory post-veto debates with investigative instruments like fact-finding missions.
- **Universalize the ACT Code:** Encourage incoming non-permanent members to formally pledge against blocking humanitarian action.
- **Accelerate Text-Based Drafting:** Transition the Intergovernmental Negotiations (IGN) to formal drafting to integrate restraint protocols into broader reform packages.

Conclusion

Regulating the veto shifts UNSC reform from unattainable immediate abolition to pragmatic behavioral discipline. Ultimately, the true credibility of voluntary restraint will depend entirely on permanent members prioritizing global humanitarian protection over narrow national strategic interests.

Q. Evaluate the prospects of voluntary veto restraint during humanitarian crises and discuss the structural challenges hindering comprehensive Security Council reform. 15 Marks

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2.1. ECONOMY

2.1.1. THE STRATEGIC BLUEPRINT OF THE INDIA-NEW ZEALAND FREE TRADE AGREEMENT

Context

The India-New Zealand Free Trade Agreement (FTA) will enter into force on October 20, aiming to double bilateral trade to ₹35,000 crore in five years. The pact grants unprecedented tariff eliminations for Indian exports while simultaneously shielding vulnerable domestic farm segments.

Introduction

Against a backdrop of escalating global tariff volatility, the India-New Zealand FTA offers a pragmatic diplomatic template. It strategically diversifies market access for India's labor-intensive enterprises while resolutely insulating domestic agricultural livelihoods from foreign competition.



What is a Free Trade Agreement (FTA)?

- **Definition:** A legally binding international treaty designed to reduce or eliminate trade barriers, such as tariffs and quotas, facilitating seamless cross-border commerce.
- **Core Mechanisms:** FTAs establish comprehensive preferential architectures governing intellectual property, investment protections, customs facilitation, and dispute resolution to integrate participating economies.

Bilateral Economic Landscape and Complementarities

- **Macroeconomic Scale & Ties:** New Zealand is India's second-largest trading partner in Oceania, with bilateral goods and services trade reaching \$2.24 billion in 2025–26 (including \$1.3 billion in merchandise trade). The relationship is anchored in shared Commonwealth heritage, democratic values, and sporting ties.
- **Diaspora Bridge:** Over 300,000 resident Indians form nearly 5% of New Zealand's population, acting as a vital cultural and institutional link.
- **Structural Complementarity:** India serves as New Zealand's 9th largest export market, supplying labor-intensive goods (textiles at 14%, gems at 5%) alongside capital products (pharmaceuticals, vehicular parts). Conversely, New Zealand exports essential industrial raw materials like timber, wool, and specialized machinery.

Comprehensive Trade Liberalisation

- **Total Tariff Elimination:** Erases import levies on 100% of Indian goods entering New Zealand, dismantling historical tariffs of up to 10% on automobiles, ceramics, and apparel.
- **Calibrated Inbound Concessions:** Permits 95% of New Zealand's export lines into India either tariff-free or at substantially reduced duty rates to lower manufacturing input costs.

Strategic Protection of Sensitive Domestic Sectors

- **Insulating the Dairy Economy:** India excluded the highly competitive dairy sector entirely from the pact to protect local livelihoods.
- **Preserving Agricultural Negative Lists:** Nearly 30% of India's total tariff lines remain outside concessions, safeguarding vulnerable farm produce such as almonds, chickpeas, peas, artificial honey, sugar, and onions.

Long-Term Investment and Financing Commitments

- **The FDI Mandate:** New Zealand formally committed to facilitating \$20 billion in direct investment into India over the next 15 years, targeting startups, advanced manufacturing, and national infrastructure.
- **External Sector Stability:** This legally tethered investment commitment ensures predictable foreign exchange inflows, aiding long-term balance-of-payments management.

Agricultural Productivity and Technology Partnerships

- **Collaborative Technology Transfer:** Replaces direct commercial competition with technological synergy, utilizing New Zealand's capabilities in apiculture and kiwifruit farming to elevate Indian yields.
- **Joint Global Manufacturing:** Encourages New Zealand firms facing domestic labor shortages to leverage India's cost-effective scale and intellectual property protections for global exports.

Labour Mobility and People-to-People Bridges

- **Service and Mobility Windows:** Secures enhanced visa provisions for Indian students and skilled professionals across IT, healthcare, and engineering, providing alternative migration routes amid Western immigration restrictions.
- **Professional Market Access:** Creates a platform for Indian companies to expand their international footprint across 118 sectors, including professional services, construction, and tourism.

The Strategic Significance of the Agreement

1. **Insulation Against Global Shocks:** Mitigates the fallout of rising Western protectionism by nimbly rerouting supply chains to favorable alternative destinations.
2. **Empowerment of MSMEs:** Delivers immediate price parity to micro, small, and medium enterprises, and handloom weavers who constitute a massive portion of the export ecosystem.
3. **A Non-Compromise Agrarian Template:** Proves that high-standard trade agreements can be concluded with competitive agricultural economies without sacrificing the domestic farm sector.
4. **Counter-Cyclical Capital Inflows:** Anchors long-term foreign capital at a juncture when broader emerging-market direct investment flows face tightening global liquidity.
5. **Deepening the Indo-Pacific Footprint:** Strengthens strategic reach across Oceania, complementing parallel negotiations with partners like Canada and Chile.

Key Challenges Confronting Implementation

1. **Limited Macroeconomic Scale:** Because bilateral commerce currently accounts for under 1% of India's aggregate international trade, the immediate growth impulse to national GDP remains constrained.
2. **Backloaded Investment Realization:** The multi-decade horizon for promised capital inflows makes near-term balance-of-payments relief modest and highly subject to macroeconomic stability.
3. **Strict Non-Tariff Barriers (NTBs):** Stringent sanitary and phytosanitary (SPS) standards in the destination market present severe compliance hurdles for agro-processing and pharmaceutical exporters.
4. **High Maritime Freight Overheads:** Significant geographical distances and transshipment bottlenecks in the South Pacific can erode the price advantages achieved through duty eliminations.
5. **Grassroots Technology Absorption Deficits:** Translating high-tech foreign horticultural techniques to fragmented, smallholder Indian farms requires extensive extension machinery that state agencies currently lack.

Strategic Way Forward

1. **Accelerate MSME Export Integration:** Conduct targeted export-readiness clinics to ensure small enterprises swiftly operationalize zero-duty access.
2. **Establish a Dedicated Fast-Track Investment Cell:** Create a specialized FDI Desk under Invest India to streamline promised funds into capital-intensive manufacturing.
3. **Harmonize Standards via Mutual Recognition Agreements (MRAs):** Expedite bilateral conformity assessments to prevent non-tariff barriers from impeding pharmaceutical and engineering shipments.
4. **Institutionalize Agritech Centers of Excellence:** Build joint research stations in domestic agricultural hubs to commercialize imported apiculture technologies locally.
5. **Optimize Oceania Shipping Logistics:** Explore cooperative transshipment agreements via Southeast Asian maritime hubs to lower logistics overheads and transit times.
6. **Replicate the Targeted Negotiation Model:** Institutionalize this framework—securing industrial duty elimination while ring-fencing sensitive farm lines—across pending FTAs with other mid-sized trading partners.

Conclusion

The India-New Zealand FTA proves that targeted deals with mid-sized economies yield strategic dividends far beyond their immediate trade volume. By insulating vulnerable farmers, opening zero-duty markets for MSMEs, and anchoring long-term foreign investment, the pact creates a robust, multi-track template for navigating an increasingly fragmented global trade environment.

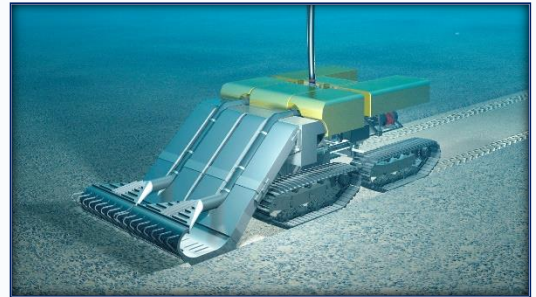
Q. Evaluate the strategic and economic significance of the India-New Zealand Free Trade Agreement in strengthening India's export resilience amidst rising global trade protectionism. 15 Marks

2.2. ENVIRONMENT

2.2.1. BEYOND THE BLUE FRONTIER: THE ETHICAL AND ECOLOGICAL DIMENSIONS OF DEEP-SEA MINING

Context

As India accelerates its deep-sea exploration capabilities, a critical debate is emerging regarding the transition from scientific research to commercial seabed mining. The fundamental question is whether demonstrating technological capacity inherently mandates the exploitation of fragile marine ecosystems.



Introduction

Led by the **Ministry of Earth Sciences (MoES)**, India's ambitious push into Earth's final frontier seeks to unlock vast marine resources. While securing critical minerals is vital for the renewable energy transition, executing large-scale extraction without comprehensive ecological baselines risks irreversible environmental damage.

What is Deep Sea Mining?

1. **Core Definition:** The extraction of valuable mineral deposits and transition metals directly from the ocean's seabed.
2. **Extraction Categories:** Commercial operations target three primary formations: **polymetallic nodules** on abyssal plains, **massive seafloor sulfide deposits** near hydrothermal vents, and **cobalt crusts** stripped from underwater rocks.
3. **Strategic Value:** These deposits contain nickel, rare earths, and cobalt—indispensable for high-capacity batteries, electric mobility, and consumer electronics as onshore reserves rapidly deplete.

How is Deep Sea Mining Regulated?

1. **Jurisdictional Boundaries:** Individual nations hold sovereign rights to manage and extract resources within their own **Exclusive Economic Zones (EEZs)**.
2. **Global Governance:** The international seabed falls under the **United Nations Convention on the Law of the Sea (UNCLOS)**.
3. **Common Heritage Principle:** The treaty designates ocean floor minerals as the "**common heritage of mankind**," mandating that the **International Seabed Authority (ISA)** oversee equitable economic sharing and strict marine environmental preservation.

Strategic Framework of the Deep Ocean Mission

1. **National Initiative:** A flagship mission recognized under the **Prime Minister's Science, Technology, and Innovation Advisory Council (PMSTIAC)**.
2. **Financial Allocation:** Approved with a **₹4,077 crore** budget over five years, allocating ₹2,823.4 crore for the first operational phase (2021-2024).

3. **Geographical Scope:** Designed to sustainably harness resources across India's **7,517 km coastline** and **2.37 million sq km EEZ**.

Core Components of the Deep Ocean Mission

1. **Ocean Climate Advisory Services:** Establishing robust observational networks and predictive climate models to provide insights into global oceanic changes.
2. **Biodiversity Conservation:** Advancing technologies to systematically study, document, and preserve uncharacterized deep-sea marine biology.
3. **Deep-Ocean Surveys:** Identifying potential mineralization sites for multi-metal hydrothermal sulphides along the mid-oceanic ridges.
4. **Oceanic Energy and Freshwater:** Developing innovative mechanisms to extract renewable power through **Ocean Thermal Energy Conversion (OTEC)** and generate potable freshwater.
5. **Advanced Marine Station:** Establishing a dedicated central facility to promote research and technological advancements in ocean biology and biotechnology.

Indigenous Deep-Sea Vehicles and Technologies

1. **MATSYA-6000 ('Samudrayaan'):** An indigenous titanium-alloy manned submersible developed by the **National Institute of Ocean Technology (NIOT)**. It can carry three aquanauts to a 6,000-meter depth for 12 hours (96 hours in emergencies).
2. **Remotely Operated Vehicles (ROVs):** Unmanned deep-sea systems jointly developed by NIOT and ISRO, equipped with HD cameras and robotic arms for mineral prospecting.
3. **Underwater Mining System ('Varaha'):** A heavy-duty seabed locomotion crawler that has successfully completed deep-water extraction trials at 5,270 meters.

Significance of the Deep Ocean Mission

1. **Catalyzing the Blue Economy:** Aims to double ocean-based industrial contributions (blue trade and manufacturing) from 5% to over **10% of India's GDP**.
2. **Unlocking Energy Reserves:** Secures access to vast underwater **gas hydrates**, offering potential energy equivalent to 1 lakh nuclear reactors.
3. **Enhancing Maritime Security:** Provides cutting-edge underwater engineering and communication capabilities that directly augment the operational domain of the **Indian Navy**.
4. **Climate Mitigation Leadership:** Supports evidence-based policymaking by mapping marine carbon dynamics, aligning with the **UN Decade of Ocean Science (2021-2030)**.

Major Environmental and Operational Challenges

1. **Destructive Sediment Plumes:** Pumping slurry and extracted sediments back into the sea creates massive sediment plumes that smother benthic creatures and severely harm filter-feeding species like deep-water corals and sponges.
2. **Pollution and Contamination:** Extraction machinery introduces unprecedented noise, vibration, and light pollution into entirely dark ecosystems, alongside the severe risk of toxic leaks and chemical fuel spills.

3. **Disruption of Marine Food Webs:** Mining impacts extend far beyond the seabed, threatening pelagic fish populations, marine mammals, and the deep ocean's essential function in regulating the global climate.
4. **Extreme Subsea Pressures:** Operating at 6,000 meters involves crushing pressure levels exceeding **60 Megapascals (MPa)**, demanding highly specialized materials to prevent equipment failure.
5. **Operational Friction:** Navigating soft, muddy seabeds poses a severe sinking risk for heavy machinery, while absolute darkness and the natural attenuation of electromagnetic waves heavily restrict remote navigation.
6. **The "Capability Equals Permission" Fallacy:** The dangerous assumption that demonstrating technical capacity inherently justifies the exploitation of fragile benthic habitats before global governance codes are finalized.

Way Forward for Sustainable Ocean Governance

1. **Marine Biomimetics:** Design submersibles and extraction equipment inspired by deep-sea organisms to naturally withstand extreme pressure, salinity, and corrosion.
2. **Sustainable Energy Innovations:** Harness tidal, wave, and OTEC technologies to power long-duration underwater missions sustainably.
3. **Advanced Sensor Integration:** Combine sonar, LiDAR, and AI-driven imaging technologies for comprehensive, non-invasive deep-sea mapping, overcoming severe visibility limitations.
4. **Strict "Necessity Testing":** Before sanctioning any commercial seabed mining, mandate empirical evidence demonstrating that virgin minerals are irreplaceable and alternatives cannot substitute them.
5. **Establish Protected Marine Zones:** Utilize environmental baseline data to formally declare vulnerable seamounts and hydrothermal vents as permanent, undisturbed conservation zones.
6. **Integrate Mission LiFE Principles:** Decouple scientific exploration from commercial exploitation by prioritizing circular economies and mindful utilization over continuous primary extraction.

Conclusion

India's mastery of deep-sea technology presents a unique civilizational test. By balancing strategic resource acquisition with stringent ecological precaution and circular consumption, the Deep Ocean Mission empowers India to set a global benchmark for responsible and truly sustainable ocean governance.

Q. *Critically evaluate the ecological and strategic implications of India's Deep Ocean Mission. How can policymakers balance the acquisition of critical minerals with the necessity of responsible global environmental governance? 15 Marks*

2.3. SCIENCE & TECHNOLOGY

2.3.1. THE WEAPONISATION OF SPACE: STRATEGIC REALITIES AND GLOBAL GOVERNANCE

Context

Although U.S. military doctrine has openly considered space control by 2025, recent admissions by defense officials regarding the deployment of "on-orbit space control weapons" to counter hostile actions have blurred the lines between defensive and offensive capabilities.



Introduction

Outer space is rapidly evolving from a domain of peaceful exploration into the "fourth frontier of war." With modern civilian and military infrastructures highly dependent on dual-use satellite systems, unregulated orbital weaponisation threatens global stability and exposes critical voids in international humanitarian law.

Strategic Importance of Space Capabilities

1. **Critical Infrastructure Backbone:** Space systems are indispensable for the continuous functioning of the global civilian economy, banking, and aviation.
2. **Military Force Multiplication:** Modern defense forces rely entirely on space architectures for real-time intelligence, surveillance, and reconnaissance (ISR).
3. **Strategic Deterrence:** Developing indigenous counter-space capabilities preserves national assets from unprovoked adversarial strikes and ensures strategic autonomy.
4. **Independent Treaty Verification:** Autonomous reconnaissance assets allow nations to independently monitor global compliance with nuclear and arms control treaties.
5. **Real-Time Border Security:** Advanced optical and radar imaging satellites enable continuous tracking of hostile troop movements and illegal maritime activities.

Militarisation vs. Weaponisation

- **Militarisation:** The use of space-based assets to assist terrestrial armies via command, control, communication, surveillance, and reconnaissance.
- **Weaponisation:** The transformation of outer space itself into a battlefield, involving the placement of orbital interceptors, direct-ascent missiles, or directed-energy weapons designed to attack enemy assets.

Why Space is a Security Domain

1. **Critical Infrastructure Reliance:** Civilian services such as telecommunications, weather forecasting, and disaster management run entirely on space-based networks.
2. **Dual-Use Ambiguity:** Commercial satellites frequently serve both civilian and military users, making them prime targets during geopolitical conflicts.

3. **Cyber & Electronic Vulnerabilities:** Ground stations and satellites face growing non-kinetic threats, including signal jamming, spoofing, and cyberattacks.

Major Types of Counter-Space Weapons

1. **Direct-Ascent ASAT Weapons:** Ground-launched missiles designed to physically intercept and destroy satellites in orbit.
2. **Co-orbital Weapons:** Systems placed into orbit capable of approaching, inspecting, or disabling another satellite.
3. **Electronic & Cyber Warfare:** Jamming and spoofing techniques that disrupt navigation signals without physically destroying the hardware.
4. **Directed-Energy Weapons:** High-powered lasers designed to blind satellite sensors or damage onboard systems.

Global Legal Architecture & Treaties

1. **Outer Space Treaty (1967):** Mandates peaceful use and prohibits deploying weapons of mass destruction (WMDs) in orbit or claiming national sovereignty over celestial bodies.
2. **Liability Convention (1972):** Establishes that the launching state is absolutely liable for damages caused by its space objects on Earth or to aircraft.
3. **Registration (1975) & Rescue (1968) Agreements:** Mandates the registration of space objects to improve transparency and requires states to assist astronauts in distress.
4. **Prevention of an Arms Race in Outer Space (PAROS):** A UN framework stressing the avoidance of an arms race and promoting peaceful space exploration.

India's Space Security Paradigm

1. **Institutional Evolution:** Transitioned from INCOSPAR (1962) to ISRO, and more recently established the **Defence Space Agency (DSA)** in 2019 to act as an aerospace command.
2. **Mission Shakti (2019):** Successfully demonstrated Anti-Satellite (ASAT) capabilities, making India the fourth nation globally to possess such deterrence.
3. **Space Situational Awareness (SSA):** Enhancing tracking capabilities for satellites and debris via **Project NETRA** and the **IS4OM** management system to ensure safe orbital operations.

Challenges of Space Weaponisation

1. **The Kessler Syndrome:** Destructive kinetic attacks generate massive, untrackable space debris, permanently threatening long-term orbital sustainability.
2. **Dual-Use Ambiguity and Law of War:** Because interconnected commercial satellites increasingly serve military functions, distinguishing legitimate targets under international humanitarian law is exceedingly difficult.
3. **Regulatory Voids:** The 1967 Outer Space Treaty prohibits WMDs but offers insufficient guardrails against modern conventional orbital weapons, cyberattacks, and AI-driven autonomous systems.
4. **Escalation and Miscalculation Risks:** Unclear definitions of "hostile action" combined with automated defensive satellite strikes create extreme instability, risking rapid terrestrial escalation.

5. **Orbital Monopolization:** Accelerated military deployment by advanced powers risks monopolizing limited orbital slots and radio frequencies, marginalizing developing nations' access.

Way Forward

1. **Define Multilateral Thresholds:** Governments must negotiate precise definitions of "hostile action" and escalation thresholds through the UN Open-Ended Working Group on PAROS.
2. **Modernize the Legal Framework:** Revisit existing treaties to explicitly address accountability for autonomous, AI-driven defensive strikes and commercial dual-use assets.
3. **Enhance Space Situational Awareness (SSA):** Nations must universally share unclassified tracking data to prevent accidental collisions and misinterpretations of proximity operations.
4. **Institute Transparency & CBMs:** Implement mandatory Confidence-Building Measures (CBMs), such as pre-launch notifications and direct hotlines, to mitigate mutual suspicion.
5. **Democratize Technology and Access:** Promote legitimate access to outer space and technology transfers to ensure orbital slots are not monopolized by a few hegemonic military powers.
6. **Integrate Cyber and Electronic Safeguards:** Prioritize the resilience of space networks and ground stations against non-kinetic threats like signal jamming and cyber-intrusions.

Conclusion

The weaponisation of space threatens to convert the ultimate global commons into a highly volatile theater of conflict. Ensuring stability requires robust Space Situational Awareness, responsible deterrence, and an urgently updated multilateral legal framework to preserve orbital space for peaceful human advancement.

Q. Critically analyse the strategic implications of space weaponisation on global security and evaluate India's preparedness to safeguard its orbital assets. 15 Marks

2.4. AGRICULTURE

2.4.1. ANATOMY OF INDIA'S GROUNDWATER CRISIS AND AGRARIAN INEQUALITY

Context

According to the 2025-26 Dynamic Groundwater Assessment, Punjab's extraction rate has surged to 152%, with 72% of its blocks categorized in the critically over-exploited 'red zone'. This severe depletion is transforming water access into a concentrated form of wealth, widening the economic divide between marginal and large-scale farmers.



Introduction

Groundwater constitutes the invisible bedrock of India's water security, fulfilling 62% of irrigation, 85% of rural, and 50% of urban water demands. However, policy-induced over-pumping and climate vulnerabilities are rapidly exhausting aquifers, necessitating an urgent shift toward decentralized, community-led management to protect ecological stability and agrarian equity.

Key Facts Regarding Groundwater

1. Groundwater is freshwater stored in subterranean layers called aquifers, comprising nearly 99% of Earth's liquid freshwater.
2. **National Extraction Status:** India extracts 245.64 Billion Cubic Meters (BCM) annually, representing a national extraction rate of 60.47%, keeping aggregate usage within the 446.90 BCM annual replenishment capacity.
3. **Punjab's Hydrological Deficit:** The principal consumer in the state is irrigation for rice and wheat, which accounts for nearly 25 BCM per year.
4. **Deepening Wells:** The fraction of observation wells with water dropping below 40 meters in the post-monsoon period grew by two percentage points between 2022 and 2025.
5. **Governance Mandate:** Water governance primarily rests with State Governments, supported technically by the Centre, directly aligning with Sustainable Development Goals 6 (Clean Water), 11, and 12.

What are the Key Factors Driving Groundwater Depletion in India?

1. **Distorted Economic and Policy Incentives:** Free agricultural electricity incentivizes unregulated pumping, while the Minimum Support Price (MSP) system heavily favors water-guzzling crops, eliminating the financial risk of over-extraction.
2. **Demographic and Urban Pressures:** Rapid population growth (reaching 1.45 billion between 2016–2023) and urbanization create impermeable "concrete sealing," blocking rainwater infiltration and causing severe cones of depression.
3. **Climate Change and Hydrological Disruption:** Increasing rainfall variability in the Southwest Monsoon reduces natural aquifer replenishment, while rising temperatures simultaneously elevate crop water demand.
4. **Archaic Legal Framework:** The Indian Easements Act, 1882, treats groundwater as a private property right linked to land ownership rather than a common-pool resource, paralyzing collective management.
5. **Institutional Fragmentation:** Agencies like the CGWB, CPCB, and Ministry of Jal Shakti operate in silos, compounded by the Water (Prevention and Control of Pollution) Act, 1974, which suffers from lax enforcement and regulatory loopholes.

How does groundwater depletion widen the gap between farmers?

1. **The Capital Gatekeeper:** As the water table plummets, only wealthier farmers can afford the substantial capital required to install deeper, high-capacity tube wells.

- 2. Unregulated Dependencies:** Marginal landholders, despite using water more efficiently, are forced into purchasing water from larger landowners, systematically transferring their wealth upward.
- 3. Inverse Productivity:** Studies in Sangrur and Barnala indicate that while larger farms earn higher overall returns, they actually record lower groundwater productivity for paddy compared to smaller farms.

What are the Key Government Initiatives for Groundwater Management and their Achievements?

- 1. Regulatory Framework:** 21 States/UTs (including Bihar and Himachal Pradesh) have adopted the Model Groundwater Bill, 2017, coordinated by the National Interdepartmental Steering Committee (NISC).
- 2. Nationwide Conservation Campaigns:** The Jal Sanchay Jan Bhagidari (JSJB) scheme completed 39,60,333 artificial recharge works by January 2026, working alongside Jal Shakti Abhiyan (JSA: CTR) for geo-tagging and borewell revitalization.
- 3. Scientific Assessment & Planning:** NAQUIM 2.0 delivers granular, Panchayat-level aquifer maps, utilizing surveillance data from 43,228 CGWB monitoring stations.
- 4. Community-Led Schemes:** Atal Bhujal Yojana promotes localized management in 7 stressed states, while Mission Amrit Sarovar targets the creation of 1-acre ponds (10,000 cubic meter capacity) across all districts.
- 5. The Master Plan:** The Artificial Recharge to Groundwater-2020 envisions 1.42 crore terrain-specific structures to capture 185 BCM of additional recharge.

The Strategic Significance of Groundwater Security

- 1. Foundation of Food Security:** Reliable, on-demand subterranean irrigation is the fundamental driver of the high-yield rice-wheat cropping system.
- 2. Rural Livelihood Anchor:** Sustains the broader agricultural economy and allied sectors, acting as the primary income base for millions of farmers.
- 3. Domestic Hydrological Backbone:** Directly meets the bulk of the nation's domestic drinking water and sanitation requirements, crucial for public health.
- 4. Drought Resilience:** Acts as a vital subterranean buffer that mitigates the impacts of erratic monsoon rainfall and seasonal dry spells.
- 5. Poverty Alleviation:** Equitable access to irrigation capital is directly correlated with poverty reduction and upward mobility among tenant cultivators.

Key Challenges Confronting Effective Aquifer Governance

- 1. Pervasive Contamination:** Industrial effluents (e.g., Kanpur tanneries) and fertilizer runoff dangerously pollute aquifers with nitrates, fluoride, and heavy metals like chromium and uranium.
- 2. Saline Intrusion:** Coastal over-pumping, compounded by sea-level rise, has permanently contaminated freshwater reserves across 28 out of 33 districts in Gujarat.

3. **Crop Switching Barriers:** Farmers hesitate to abandon monocultures due to unaddressed uncertainties in storage, alternative pricing, and processing infrastructure.
4. **Efficiency Overwhelmed by Scale:** Despite state interventions, overall extraction volumes continually outpace localized conservation efficiency gains, resulting in only a marginal reduction in over-exploited blocks.
5. **Voluntary Scheme Limitations:** Conservation initiatives like Punjab's 'Pani Bachao, Paisa Kamao' suffer from low enrollment because they rely on optional participation rather than default, mandatory integration.

Way Forward

1. **Water-Smart Agricultural Practices:** Accelerate the adoption of micro-irrigation and zero tillage by converging PMKSY with the Atal Bhujal Yojana in highly stressed regions.
2. **Institutional Re-engineering:** Replace colonial-era property laws with the public trust doctrine and empower local Aquifer Management Committees (AMCs) to enforce limits using NAQUIM 2.0 data.
3. **Digital Water Command System:** Establish a national IoT sensor network connected to the 'Bhu-Neer' AI platform for predictive analytics and real-time volumetric monitoring at the connection level.
4. **Financial Restructuring:** Shift to a Direct Benefit Transfer (DBT) model for electricity, paying farmers for unused pumping units, and implement a Groundwater Security Cess on industries.
5. **Scale Nature-Based Solutions:** Mandate urban Rainwater Harvesting (RWH) bylaws, recycle treated wastewater, and deploy Managed Aquifer Recharge (MAR) tailored to specific terrains (e.g., biochar filtration for agricultural runoff).
6. **Foster Climate Resilience:** Integrate climate-resilient crops (millets, pulses) into state procurement policies and provide communities with simplified Water Budgeting Tools to build local stewardship.
7. **Subsidize the Cultivator, Not Extraction:** Redirect welfare to directly support smallholders and tenant farmers to collectivize irrigation infrastructure, ensuring benefits follow the actual tiller rather than the pump owner.

Conclusion

Groundwater depletion has evolved from a purely ecological concern into a severe crisis of agrarian equity. Achieving long-term sustainability requires dismantling distorted power subsidies, embracing the public trust doctrine, and ensuring that conservation incentives directly empower the cultivator through localized, climate-resilient stewardship.

Q. Examine the factors responsible for depleting groundwater in India. What are the steps taken by the government to mitigate such depletion of groundwater? 15 Marks

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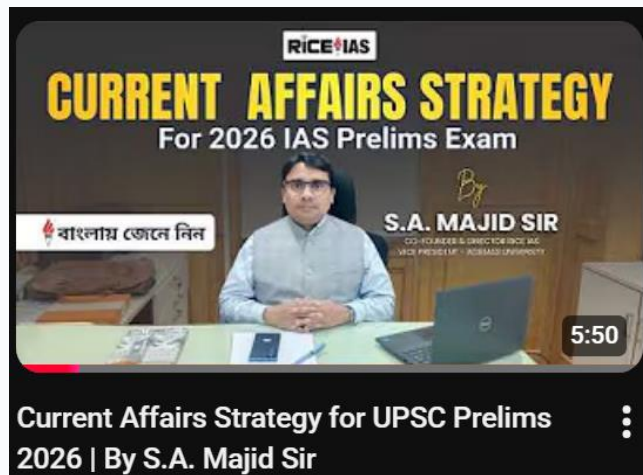
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