



# Weekly Current Affairs

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## INDIA'S GREEN RECOVERY: PATHWAY TO SUSTAINABLE GROWTH

### WHY IN THE NEWS?

The India State of Forest Report 2023 (ISFR 2023) was released by the Minister for Environment, Forest and Climate Change, Shri Bhupender Yadav, at the Forest Research Institute, Dehradun.



### KEY FACTS ABOUT FOREST SURVEY OF INDIA (FSI)

Aspect	Details
Founded	June 1981
Headquarters	Dehradun, Uttarakhand
Parent Ministry	Ministry of Environment, Forest and Climate Change, Government of India
Primary Functions	Conduct forest surveys, studies, and research to monitor land and forest resources and provide data for national planning and conservation.
Predecessor	Preinvestment Survey of Forest Resources (PISFR), initiated in 1965 with sponsorship from FAO and UNDP.
Origin	Created based on the 1976 recommendation of the National Commission on Agriculture (NCA).
Biennial Reports	Publishes the "State of Forest Report" (SFR) every two years since 1987.
Forest Cover Monitoring	Uses remote sensing satellite data and GIS technology for digital interpretation.
Forest Fire Monitoring	Active since 2004, uses MODIS (Moderate-Resolution Imaging Spectrometer) and GIS technology.
Training	Provides training to forester cadres of various Indian states.
Publications	<ul style="list-style-type: none"> <li>– "The Indian State of Forest Reports" (biennial).</li> <li>– Area-specific "Inventory and Wood Consumption Studies".</li> </ul>

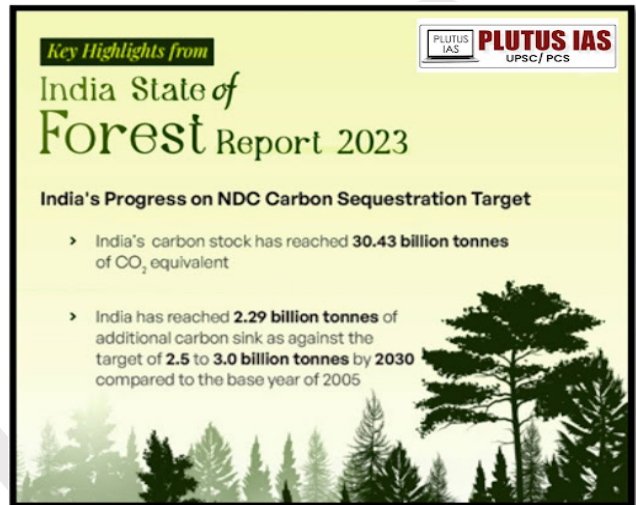
### INDIA STATE OF FOREST REPORT:

**Biennial Publication:** Prepared by the Forest Survey of India (FSI), the ISFR has been published every two years since 1987.

**18th Edition:** The 2023 report marks the 18th release in the series.

**Comprehensive Assessment:** It involves a detailed analysis of India's forest and tree resources using:

- 1) Remote Sensing Satellite Data.
- 2) Field-Based National Forest Inventory (NFI).





### THE FOREST REPORT CONTAINS THE FOLLOWING:

1. Forest Cover
2. Tree Cover
3. Mangrove Cover
4. Growing Stock
5. Carbon Stock in India's Forests
6. Instances of Forest Fire
7. Agroforestry.

### MAJOR FINDINGS OF THE INDIA STATE OF FOREST REPORT 2023

Category	Details
Forest and Tree Cover	8,27,357 sq km (25.17% of geographical area), comprising 7,15,343 sq km (21.76%) as forest cover and 1,12,014 sq km (3.41%) as tree cover.
Increase since 2021 Assessment	Forest and tree cover increased by 1,445 sq km, including 156 sq km of forest cover and 1,289 sq km of tree cover.
Top States by Forest & Tree Cover Increase	<ol style="list-style-type: none"> <li>1. Chhattisgarh (684 sq km)</li> <li>2. Uttar Pradesh (559 sq km)</li> <li>3. Odisha (559 sq km)</li> <li>4. Rajasthan (394 sq km)</li> </ol>
Top States by Forest Cover Increase	<ol style="list-style-type: none"> <li>1. Mizoram (242 sq km)</li> <li>2. Gujarat (180 sq km)</li> <li>3. Odisha (152 sq km)</li> </ol>
Largest Forest & Tree Cover (Area-wise)	<ol style="list-style-type: none"> <li>1. Madhya Pradesh (85,724 sq km)</li> <li>2. Arunachal Pradesh (67,083 sq km)</li> <li>3. Maharashtra (65,383 sq km)</li> </ol>
Largest Forest Cover (Area-wise)	<ol style="list-style-type: none"> <li>1. Madhya Pradesh (77,073 sq km)</li> <li>2. Arunachal Pradesh (65,882 sq km)</li> <li>3. Chhattisgarh (55,812 sq km)</li> </ol>
Highest Forest Cover (% of Area)	<ol style="list-style-type: none"> <li>1. Lakshadweep (91.33%)</li> <li>2. Mizoram (85.34%)</li> <li>3. Andaman &amp; Nicobar Islands (81.62%)</li> </ol>
States with >33% Forest Cover	19 states/UTs; 8 of these (Mizoram, Lakshadweep, A&N Islands, Arunachal Pradesh, Nagaland, Meghalaya, Tripura, Manipur) have >75% forest cover.
Mangrove Cover	Total: 4,992 sq km.



Category	Details
<b>Growing Stock</b>	Total: 6,430 million cum – Inside Forest: 4,479 million cum – Outside Forest: 1,951 million cum Increase: 262 million cum (91 inside forest, 171 outside).
<b>Bamboo Bearing Area</b>	Total: 1,54,670 sq km Increase: 5,227 sq km since 2021.
<b>Timber Production (Annual Potential)</b>	91.51 million cum from trees outside forest.
<b>Carbon Stock in Forests</b>	Total: 7,285.5 million tonnes Increase: 81.5 million tonnes since 2021.
<b>Carbon Sequestration (NDC Target)</b>	India's carbon stock: 30.43 billion tonnes of CO <sub>2</sub> equivalent Additional sink since 2005: 2.29 billion tonnes Target: 2.5–3.0 billion tonnes by 2030.
<b>Utility of ISFR Data</b>	Vital for policymakers, planners, State Forest Departments, research organizations, development agencies, academicians, and civil society for conservation and resource management.

#### KEY GOVERNMENT POLICIES AND INITIATIVES TO PROTECT AND EXPAND FOREST COVER:

Scheme/Policy	Details
<b>National Mission for a Green India (GIM)</b>	Launched in 2014, focuses on enhancing forest cover through protection, restoration, and expansion initiatives. Rs. 944.48 crore allocated to 17 States and 1 UT.
<b>Nagar Van Yojana (NVY)</b>	Established in 2020 to develop green spaces in urban and peri-urban areas. 546 projects approved with Rs. 431.77 crore allocated across 31 States/UTs.
<b>School Nursery Yojana (SNY)</b>	Aims to raise awareness about tree planting in schools. 743 projects sanctioned in 19 States/UTs with Rs. 4.80 crore allocated.
<b>Mangrove Initiative for Shoreline Habitats &amp; Tangible Incomes (MISHTI)</b>	Five-year initiative (2023-2028) to restore mangroves along India's coastline. Rs. 17.96 crore allocated for states like Andhra Pradesh, Gujarat, Odisha, and more.
<b>National Plan for Conservation of Aquatic Ecosystems (NPCA)</b>	Focuses on conservation and management of wetlands through a cost-sharing model between the Central and State Governments.
<b>Ek Ped Maa Ke Naam</b>	Launched in 2024 to encourage tree planting in honor of mothers, fostering a personal connection with nature.
<b>Compensatory Afforestation Fund Management and Planning Authority (CAMPA)</b>	Offsets forest loss by supporting afforestation projects under the Van Sanrakshan Evam Samvardhan Adhiniyam, 1980.
<b>Twenty-Point Programme (Afforestation Targets)</b>	Sets annual afforestation goals for States/UTs through Central and State schemes, NGO participation, and private sector efforts.

Scheme/Policy	Details
<b>Awareness and Mass Plantation Drives</b>	Promotes tree planting through events like Van Mahotsav, World Environment Day, and International Day of Forests.
<b>Indian Forest Management Standard</b>	Part of the National Working Plan Code – 2023, establishes criteria for sustainable forest management and certification for timber producers.
<b>National Action Plan on Forest Fire (2018)</b>	Provides measures to prevent forest fires, enhance resilience, and improve community capacity for fire prevention and control.
<b>Joint Forest Management (JFM)</b>	Involves community participation through Joint Forest Management Committees for better forest and wildlife protection, in line with the National Forest Policy, 1988.
<b>Conservation of Mangroves and Coral Reefs</b>	Supports coastal States/UTs for mangrove protection under the National Coastal Mission.
<b>Legal Framework for Forest Protection</b>	Enforced through laws like the Indian Forest Act, 1927; Wildlife Protection Act, 1972; and State-specific forest laws for sustainable forest and wildlife management.

### THE SIGNIFICANCE OF THE INDIA STATE OF FOREST REPORT (ISFR):

**Comprehensive Forest Monitoring:** The Forest Reports provide crucial data on forest cover, tree cover, and various forest-related parameters, allowing for informed policy-making and resource management.

**Tracking Environmental Changes:** These reports help track changes in the forest ecosystem, such as deforestation, afforestation, and carbon stock variations, which are essential for assessing the impact of environmental policies.

**Policy Formulation and Planning:** The findings guide the formulation of national and state-level forest policies and the allocation of resources for conservation efforts, contributing to long-term environmental sustainability.

**Conservation Efforts:** By highlighting areas of concern, such as forest degradation, loss of biodiversity, or declining forest cover, these reports help prioritize conservation actions and ensure effective management of natural resources.

**Carbon Sequestration Monitoring:** The reports offer insight into the country's carbon stock, crucial for assessing the progress towards international climate commitments, including India's Nationally Determined Contributions (NDCs) under the Paris Agreement.

**Encouraging Public Awareness and Participation:** The publication of these reports increases public awareness about forest health and conservation, motivating local communities, NGOs, and other stakeholders to engage in sustainable forestry practices.

**Global Credibility:** As a recognized source of credible data, the ISFR enhances India's standing in international environmental assessments and climate negotiations.

### CRITICISM OF THE FOREST REPORT FINDINGS:

**Definition of Forest:** cover includes areas with a tree canopy  $\geq 10\%$ , regardless of ownership or legal status, incorporating orchards, bamboo, and palm. Experts criticize this broad definition, which may inflate data.

**Data Transparency:** Granular data, though prepared by the Forest Survey of India (FSI), is not made publicly available.

**Inflated Data Claims:** Experts like Prakriti Srivastava and Prerna Singh Bindra claim the inclusion of bamboo plantations, coconut groves, and orchards skews forest cover data.

**Unexplained Losses:** ISFR 2023 does not explain the reported loss of 1,488 sq km of unclassified forests between 2021 and 2023.

**Tree Cover Reclassification:** Out of 1,445.81 sq km added as forest area, 1,289 sq km is classified as tree cover, including roadside and immature trees. Bamboo clumps and smaller trees (5-10 cm in diameter) were included for the first time, revising previous data.

**Carbon Stock Concerns:** Despite an estimated increase in carbon stock, experts argue this overlooks permanent forest losses due to infrastructure projects.

**Diversion of Forest Land:** Permanent conversions of forest land for projects like dams and roads are not removed from records, potentially inflating data.

**Hill District Forest Cover:** Forest cover in hill districts is only 40% of their geographical area, far below the National Forest Policy's target of 66.6%.

**Mangrove Cover Decline:** Mangrove cover decreased by 0.15%, while 'moderately dense' and 'open' forests declined by 1,043.23 sq km and 2,480.11 sq km, respectively.

#### WAY FORWARD:

**Digitization of Forest Records:** Implement the 2011 Supreme Court order for digitized forest maps, geo-referencing, and detailed documentation of diverted forest lands.

**Planting Trees:** Focus on planting trees along rivers, canals, roadsides, barren hills, and tank bunds, with species suited to local geographies.

**Public Awareness:** Educate citizens about the importance of forest conservation and sustainable practices.

**Technological Interventions:** Use remote sensing to monitor forest cover, detect vulnerable areas, and track forest fires effectively.

**Agroforestry Promotion:** Encourage the integration of trees into farming systems to improve forest cover and farmer income.

**Creating Forest Corridors:** Develop forest corridors to protect wildlife habitats and facilitate safe animal movement.

**Action Against Illegal Activities:** Strengthen enforcement to prevent illegal tree felling and forest clearing.

**Participation in Government Schemes:** Leverage schemes like GIM, MGNREGA, and CAMPA for afforestation and conservation efforts.

#### CONCLUSION:

India is advancing steadily towards environmental sustainability, as highlighted in the 2023 India State of Forest Report. Growth in forest and tree cover, reduced fire incidents, and flourishing agroforestry underscore the nation's commitment to conservation. Through innovative policies and community involvement, India is protecting and restoring its natural resources, setting a strong foundation for a greener future.

#### PRELIMS QUESTION:

**Q. Consider the following:**

1. Forest Cover
2. Tree Cover
3. Mangrove Cover
4. Growing Stock
5. Carbon Stock in India's Forests
6. Instances of Forest Fire
7. Bamboo Cover

**How many of the above are Assessed in India's State of Forest Report 2023?**

- A. Only four
- B. Only five
- C. Only Six
- D. All Seven

**ANSWER: D**

### MAINS QUESTION:

**Q. In light of the challenges identified in the India State of Forest Report 2023, critically analyze the measures needed to address these challenges. How can India ensure sustainable forest management while balancing developmental and conservation goals? (Answer in 250 words)**

### ROLE OF PMO IN SHAPING FOREIGN POLICY

#### WHY IN THE NEWS?

The tribute by India's External Affairs Minister, Dr S. Jaishankar, to the late former Prime Minister, in which he expressed sorrow over his passing, has made headlines because of its profound acknowledgement of the late leader's dual legacy both in economic reforms and foreign policy. Dr Jaishankar's statement highlights the former Prime Minister's key role in shaping India's economic transformation and strategic foreign policy shifts, marking him as a pivotal figure in India's modern history. In particular, the tribute underlined that the late Prime Minister was not only recognized for his economic reforms but was also instrumental in strategic corrections that influenced India's global positioning. Dr Jaishankar, who had the privilege of working closely with him, emphasized the former leader's kindness and courtesy, which added a personal touch to his public reflection.



#### LEGACY OF ATAL BIHARI VAJPAYEE:

**1. 1998 Nuclear Tests:** Vajpayee's government conducted nuclear tests in May 1998, asserting India's position as a nuclear power. The tests were driven by security concerns, particularly from Pakistan and China. While initially met with international condemnation, the decision helped eliminate India's nuclear ambiguity, leading to global recognition of India's nuclear status. Vajpayee's stance on nuclear deterrence was pivotal in shaping India's future security policy.

#### 2. Diplomatic Engagement:

**United States:** Despite sanctions after the tests, Vajpayee's diplomacy with the U.S., led by Foreign Minister Jaswant Singh, paved the way for improved relations and the eventual Indo-U.S. nuclear deal in 2005.

**China:** Vajpayee worked to stabilize relations with China, marking a historic visit to Beijing in 2003. He initiated confidence-building measures and secured China's recognition of Sikkim as part of India.

**Pakistan:** Vajpayee sought peace with Pakistan, exemplified by the Lahore Declaration in 1999. However, the Kargil War later tested his resolve. Despite the conflict, he maintained a peace dialogue with Pakistan, underscoring his commitment to diplomacy.

**Israel and West Asia:** He also strengthened ties with Israel and engaged strategically with Iran, enhancing India's influence in West Asia.



**3. Global Vision:** Vajpayee's foreign policy was marked by a balance of security and diplomacy. His leadership solidified India's nuclear deterrence, expanded strategic partnerships, and elevated India's role on the global stage, laying the foundation for its rise as a major power.

### MANMOHAN SINGH NUCLEAR TEST AND PAKISTAN ENGAGEMENT:

**1. India-US Nuclear Deal (2005-2008):** Manmohan Singh's push for the India-US nuclear deal was hailed as a diplomatic breakthrough but also faced considerable opposition.

**2. Overdependence on the U.S.:** While the deal opened up access to nuclear technology and fuel, critics argued that it made India overly dependent on the U.S. for its nuclear energy needs. The agreement required India to place its civilian nuclear facilities under IAEA safeguards, but this was seen as compromising India's strategic autonomy. The deal was viewed by some as a concession to U.S. power, potentially limiting India's freedom in future nuclear policy decisions.

**3. Strategic Concerns:** The deal was also criticized for essentially legitimizing India's nuclear status without the obligations of the Nuclear Non-Proliferation Treaty (NPT). Many analysts believed this set a dangerous precedent, undermining global non-proliferation efforts. Moreover, Pakistan viewed the agreement as a destabilizing factor in South Asia, as it strengthened India's nuclear capabilities without similar concessions to Pakistan. Critics argued that the deal could fuel an arms race in the region.

**4. Domestic Fallout:** The deal was highly controversial domestically. Opponents within India, including several political parties, feared it would constrain India's strategic autonomy, tying the country closer to U.S. interests. Despite the approval of the deal by Parliament, many felt Singh had compromised too much for the sake of international recognition.

### ENGAGEMENT WITH PAKISTAN: MANMOHAN SINGH'S DIPLOMATIC JOURNEY:

**1. Early Optimism and Fragile Progress:** Singh's administration aimed to improve ties with Pakistan, restarting peace talks in 2004 and enhancing confidence-building measures, such as resuming transportation links between Kashmir regions. However, these efforts were undermined by unresolved issues like Kashmir, cross-border terrorism, and military tensions.

**2. Mumbai Attacks: A Turning Point:** The 2008 Mumbai attacks, carried out by Pakistan-based terrorists, marked a significant setback. India's demand for action against the attackers was met with Pakistan's inaction and denial, leading to a sharp decline in bilateral relations. Critics argued that Singh's dialogue-focused approach failed to address Pakistan's reluctance to combat terrorism.

**3. Stalled Dialogue and Criticism:** Following the Mumbai attacks, the peace process effectively stalled. While Singh's restraint in avoiding military escalation was noted, critics claimed his diplomacy lacked the leverage and strategy needed to compel Pakistan to act against cross-border terrorism, ultimately emboldening Islamabad.

### PM MODI'S GREATER ENGAGEMENT AND MULTI-ALIGNMENT:

Prime Minister Narendra Modi's foreign policy is defined by greater engagement with global powers and a multi-alignment strategy aimed at strengthening India's global influence while balancing diverse relationships.

#### 1. Greater Engagement with Global Powers

**United States:** Strengthened defence ties, trade partnerships, and strategic cooperation, especially to counter China's rise.

**Russia:** Maintained strong defence and energy ties, ensuring a balanced approach despite closer U.S. ties.

**China:** Economic engagement tempered by border tensions (e.g., Galwan). India counterbalances China's influence via the Quad.

**Japan:** Enhanced cooperation on infrastructure and defence, reinforcing India's strategic position in Asia.

## 2. Multi-Alignment Strategy

**South Asia:** Focus on regional ties, with strained relations with Pakistan over Kashmir and terrorism. Strengthened ties with Bangladesh and Sri Lanka.

**Middle East & Africa:** Expanded ties with Gulf countries for energy and security. Deepened relations with Israel.

**Indo-Pacific:** Active in the Quad, positioning India as a counterbalance to China.

**3. Economic Diplomacy:** Modi's push for trade deals and foreign investment aims to boost India's global economic standing. Initiatives like Make in India seek self-reliance and economic growth, despite challenges like trade imbalances.

## CHALLENGES TO MANOEUVRING INDIA'S FOREIGN POLICY:

- 1. Russia-Ukraine Tensions:** India faces a dilemma balancing its long-standing defence ties with Russia while aligning with global pressures, especially on energy sanctions and broader geopolitical issues, given its growing ties with the U.S.
- 2. Energy Insecurity Due to Middle East Instability:** India's reliance on Middle East oil makes it vulnerable to disruptions from regional conflicts (e.g., Iran, Saudi Arabia, Iraq) and instability in the Persian Gulf, threatening energy security.
- 3. Tightrope Walking Between Major Powers:** India must balance its multi-alignment strategy—maintaining strong ties with the U.S., Russia, and China, while managing tensions, especially in the Indo-Pacific.
- 4. Upcoming U.S. Administration:** The uncertainty of a new U.S. administration could alter U.S.-India relations, impacting defence cooperation, trade, and regional security, requiring India to adapt diplomatically.

- 5. Tensions in India's Backyard (e.g., Bangladesh):** Regional instability—including issues with Bangladesh, Sri Lanka, and Nepal—poses risks to India's security and economic interests in its neighbourhood.
- 6. Curse of Geography:** China and Pakistan: India's proximity to China (with border disputes) and Pakistan (over Kashmir and cross-border terrorism) forces India to adopt a cautious, defensive foreign policy.
- 7. Voice in Regional Forums:** India's influence in regional organizations like SAARC, BRICS, and SCO is limited by India-Pakistan tensions and strained relations with China, making it challenging to assert its leadership.

## FUTURE COURSE OF ACTION:

- 1. Balancing Relations with Russia and the U.S.:** India must strengthen ties with both Russia and the U.S., expanding defence cooperation with the U.S. while maintaining strategic autonomy with Russia. It should also diversify its energy sources to avoid over-dependence on any single region.
- 2. Strengthening Regional Security and Diplomacy:** India should foster peaceful ties in South Asia, particularly with Bangladesh, Sri Lanka, and Nepal, while addressing security concerns. Engagement with Pakistan must be conditioned on countering terrorism and resolving disputes through dialogue.
- 3. Energy Security Strategy:** Diversifying energy sources, including renewables and partnerships with Australia, Africa, and other suppliers, is crucial to safeguard against Middle East instability.
- 4. China Engagement:** India should compartmentalize economic cooperation with China from security issues, strengthen its role in the Indo-Pacific through the Quad, and maintain a strong defence posture against Chinese aggression.
- 5. Global Influence and Multilateral Engagement:** India must assert its global role by engaging in

platforms like the UN, BRICS, SCO, and G20, emphasizing leadership in climate change, digital governance, and peacekeeping.

**6. Economic Diplomacy and Trade Deals:** India should pursue trade agreements focusing on manufacturing, technology, and green energy, leveraging Make in India and Atmanirbhar Bharat to attract foreign investment and boost economic growth.

**7. Internal Cohesion for External Influence:** Strengthening domestic stability on issues like Kashmir, economic reform, and security will enhance India's global influence, presenting a strong democratic model on the world stage.

## CONCLUSION

India's future foreign policy will need to strike a balance between engagement with global powers, regional security concerns, and internal growth. As a rising global power, India's strategic autonomy, economic dynamism, and diplomatic initiatives must align with its national interests. A careful mix of traditional alliances, multilateral engagement, and forward-thinking policies will help India overcome the challenges it faces, ensuring that it remains a prominent player in shaping global affairs in the years to come.

## PRELIMS QUESTION:

**Q. Which of the following best describes India's foreign policy approach under Prime Minister Narendra Modi?**

1. Emphasis on non-alignment and neutrality in global geopolitics
2. Greater engagement with global powers through a multi-alignment strategy
3. Exclusive focus on strengthening ties with Russia and China
4. Isolation from global diplomatic and economic partnerships

**Choose the correct answer:**

- A. 1 and 2
- B. 2 and 4
- C. 3 only
- D. 2 only

**Answer: D**

## MAINS QUESTION:

**Q. Discuss the key challenges and strategies that India must adopt to navigate its foreign policy in a multi polar world. How can India balance its relations with major powers while ensuring regional stability and energy security?**

**(250 words, 15 marks)**

## CITIZEN-CENTRIC GOVERNANCE: SHAPING A BETTER FUTURE

### WHY IN THE NEWS?

Recently, in his monthly radio program Mann Ki Baat, India's Prime Minister, highlighted the critical importance of citizen-centric governance. This emphasis underscores the government's commitment to placing citizens at the core of policymaking and governance processes. By advocating for more inclusive, transparent, and accountable systems, the Prime Minister aims to ensure that governance reflects the needs, aspirations, and welfare of the common people. This focus on citizen-centric governance is seen as a step toward strengthening democracy, enhancing public participation, and fostering a deeper connection between the government and its citizens.



**WHAT IS CITIZEN-CENTRIC GOVERNANCE?**

Citizen-centric governance refers to a governance approach that prioritizes the needs, interests, and well-being of the citizens at the heart of public administration and policy-making. It emphasizes creating systems and processes that are responsive, efficient, and transparent, ensuring that government actions align with the demands and expectations of the people it serves.

1. **Inclusion and Participation:** Actively involving citizens in decision-making processes, such as policy formulation, legislative decisions, and community development. This ensures that people have a say in matters that impact their lives.
2. **Transparency:** Ensuring that government processes, decisions, and actions are open to scrutiny, making information accessible to citizens and allowing them to hold government officials accountable.
3. **Responsiveness and Efficiency:** Delivering public services that are effective, timely, and meet the needs of the citizens. This includes reducing bureaucracy, improving service delivery, and addressing public concerns promptly.
4. **Accountability:** Citizens are empowered to hold

public officials responsible for their actions, demanding action when promises are not kept and ensuring that policies are implemented as intended.

**PRINCIPLE OF CITIZEN-CENTRIC GOVERNANCE:**

Citizen-centric governance prioritizes the needs, welfare, and rights of citizens in government actions.

1. **Rule of Law:** Ensures clear legal rights and swift access to justice for all citizens, protecting individual rights.
2. **Transparency:** Promotes open decision-making processes, making information about policies and governance readily available to foster trust.
3. **Accountability:** Holds government officials responsible for their actions, allowing citizens to demand explanations and report grievances.
4. **Decentralization:** Empowers local communities by delivering services and decision-making closer to citizens, enhancing responsiveness.
5. **Responsive Institutions:** Establishes agile government institutions that can quickly adapt to the needs and challenges of the population.
6. **Efficiency:** Delivers government services effectively and promptly, minimizing delays and ensuring optimal use of public resources.

**ISSUES STILL PERSIST:**

1. **Digital Divide:** Limited internet access in rural areas excludes many from digital services like e-Governance and DBT.
2. **Bureaucratic Delays:** Slow grievance redressal and application processing hinder timely resolution.
3. **Lack of Awareness:** Many citizens remain unaware of their rights and available services, limiting engagement.
4. **Corruption & Lack of Transparency:** Despite reforms, corruption and opacity still obstruct effective service delivery.



5. **Uneven Implementation:** Disparities in the adoption of initiatives across states create inconsistent service delivery.
6. **Gender & Social Inequalities:** Gender and social biases persist, affecting access to services and representation.
7. **Rural Grievance Resolution:** Grievance systems are less accessible in rural areas, limiting timely support.
8. **Overload of Grievances:** High volumes of complaints overwhelm systems, causing delays and unresolved issues.

## CONCLUSION

Citizen-centric governance in India has gained momentum through initiatives like Sushasan Saptah, Digital India, and CPGRAMS, aiming to enhance transparency, inclusivity, and efficiency. These efforts focus on improving service delivery, addressing grievances, and fostering accountability. Challenges like the digital divide, bureaucratic delays, uneven implementation, and gender/social inequalities persist, requiring further reforms. Despite these hurdles, the push for citizen engagement and responsive governance continues to strengthen democracy and better align government actions with the people's needs.

## RECENT INITIATIVES TO PROMOTE CITIZEN-CENTRIC GOVERNANCE:

Initiative	Description	Key Achievements/Impact
<b>Sushasan Saptah &amp; Prashasan Gaon Ki Aur Campaign</b>	Nationwide campaigns addressing public grievances and improving service delivery.	Over 51,000 grievance camps, 2.99 crore applications disposed, 3.4 lakh grievances redressed.
<b>Digital India</b>	Promoting e-governance and digital platforms for citizen services.	Increased access to online services like MyGov and Direct Benefit Transfer (DBT).
<b>CPGRAMS</b>	Upgraded grievance redressal system to resolve public complaints efficiently.	Over 3.4 lakh grievances were redressed during the 2024 campaign.
<b>Abhinav Pahal</b>	Encouraging districts to adopt successful governance models.	Districts implementing best practices from award-winning initiatives.
<b>National Good Governance Webinars</b>	Webinars on best governance practices, particularly in e-governance and public service delivery.	Over 1,000 field officers participated in 6 webinars in 2024.
<b>State Collaborative Initiative Scheme (SCI)</b>	Supporting state governments with projects to enhance governance and public service delivery.	Rs. 16.22 crore was released for 15 new projects in various states.
<b>POSH Act Awareness</b>	Workshops raising awareness on the Prevention of Sexual Harassment Act, ensuring safer workplaces.	Key workshops were conducted for awareness of POSH Act 2013 provisions.
<b>Rajbhasha Kirti Award</b>	Award for excellence in promoting Hindi in official communications.	DARPG awarded First Prize for Hindi usage in official functions (2023-24).
<b>Women in Civil Service</b>	Empowering women leaders and promoting gender inclusivity in governance.	Virtual roundtable with key women leaders on International Women's Day.

**PRELIMS QUESTION:****Q. Consider the following statements:**

1. Citizen-centric governance aims to prioritize the needs, interests, and welfare of citizens in government actions.
2. The Sushasan Saptah & Prashasan Gaon Ki Aur Campaign primarily focuses on promoting digital literacy in urban areas.
3. CPGRAMS (Centralized Public Grievance Redress and Monitoring System) is an initiative to resolve public complaints efficiently.

**How many of the statements given above are correct?**

- A. Only one
- B. Only two
- C. All three
- D. None

**Answer: A**

**MAINS QUESTION:**

**Q. Discuss the concept of citizen-centric governance and examine the recent initiatives taken by the Indian government to promote it. What challenges persist in its implementation, and how can these be addressed to ensure more inclusive and efficient governance?**

**(250 words, 15 marks)**

**LIGHTHOUSE TOURISM IN INDIA:  
ILLUMINATING MARITIME HERITAGE AND  
DRIVING ECONOMIC GROWTH**

**WHY IN THE NEWS?**

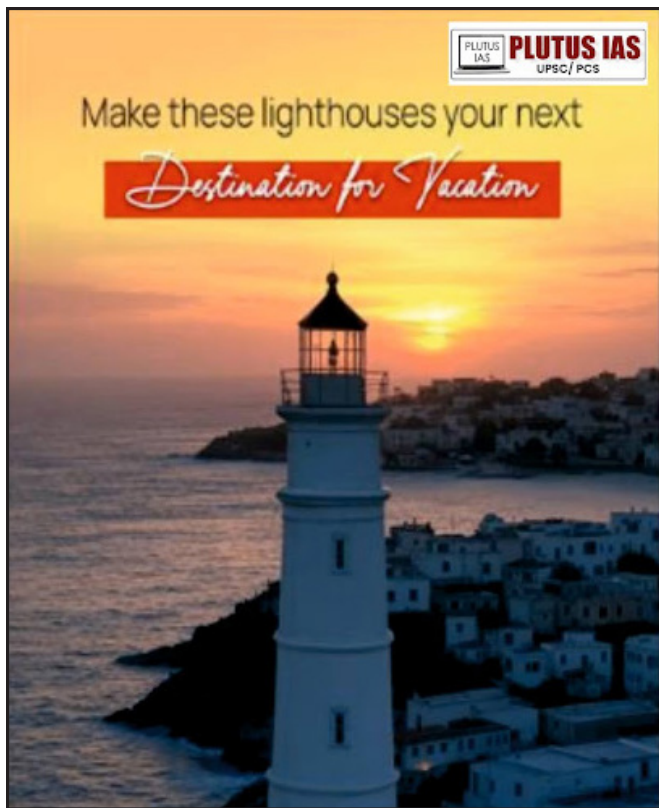
India, with a coastline spanning over 7,500 kilometers and home to 204 lighthouses, is now witnessing a transformative initiative by the Government of

India. Traditionally serving as navigational aids for seafarers, these iconic structures are being reimaged as tourism destinations under the government's developmental vision. This initiative seeks to preserve the historical and architectural significance of lighthouses while unlocking their potential for economic growth and community empowerment.

**WHAT IS LIGHTHOUSE TOURISM?**

Lighthouse tourism involves transforming lighthouses and their surrounding areas into vibrant tourist attractions. Often situated in scenic coastal or island settings, these structures uniquely blend natural beauty, maritime history, and recreational activities. The Central Government is promoting lighthouse tourism as part of its Maritime India Vision (MIV) 2030 and Amrit Kaal Vision 2047 to preserve India's cultural heritage and maritime legacy. This initiative seeks to boost India's tourism potential, create employment opportunities, and foster local economic growth.

**SIGNIFICANCE OF LIGHTHOUSE TOURISM:**



### SIGNIFICANCE OF LIGHTHOUSE TOURISM:

**Significance Of Lighthouse Tourism in India**

A 400% rise in footfall, from 4 lakh visitors in 2014 to 16 lakhs in 2023-24

Dedicated 75 iconic lighthouses across 9 coastal states and 1 union territory, lighthouses now feature museums, amphitheatres, and parks, enhancing their appeal.

As of September 2024, the current fiscal year 2024-25 has already welcomed more than 10 lakh visitors.

Creation of over 150 direct and 500 indirect jobs in hospitality, transport, and local crafts for the local communities.

**Job Creation:** The initiative has led to the creation of 150 direct and 500 indirect employment opportunities in sectors like hospitality, transportation, tour operations, and local crafts, boosting livelihoods in surrounding areas.

**Economic Boost:** Increased tourist footfall has directly benefited local businesses such as hotels, restaurants, shops, and artisans, fostering economic activity in coastal regions.

**Preservation of Heritage:** With a ₹60 crore investment, 75 iconic lighthouses have been developed with modern amenities like museums, amphitheatres, and children's parks, ensuring the conservation of India's maritime history while making it accessible to the public.

**Tourist Attraction:** In 2023-24, these lighthouses attracted 16 lakh visitors, a significant rise from just 4 lakh visitors in 2014, marking a 400% increase in footfall. In 2024-25, over 10 lakh tourists visited by September, including more than 5 lakh between April and June 2024, showcasing their growing popularity.

**Community Empowerment:** Tourism has empowered local communities by creating opportunities for skill development and enhancing participation in tourism-related activities, uplifting livelihoods.

**Global Appeal:** The initiative under Maritime India Vision 2030 and Amrit Kaal Vision 2047 aligns with India's vision to showcase its maritime and cultural legacy, drawing attention from both domestic and international tourists.

**Sustainable Tourism:** By integrating eco-friendly practices and promoting heritage conservation, the initiative ensures tourism development aligns with environmental and cultural preservation.

**Enhanced Infrastructure:** The development of tourist-friendly facilities has transformed lighthouses into hubs for history, adventure, and leisure, making them unique travel destinations that appeal to diverse demographics.



Initiative/Scheme	Details
<b>Indian Lighthouse Festival</b>	– The 1st <b>Bharatiya Prakash Stambh Utsav</b> was inaugurated on <b>23rd September 2023</b> at Fort Aguada, Goa by Union Minister Shri Sarbananda Sonowal and Goa CM Shri Pramod Sawant.
	– The 2nd Festival was held in Odisha, where two lighthouses at Chaumuck (Balasore) and Dhamra (Bhadrak) were dedicated, promoting maritime heritage and tourism.
<b>Stakeholders Meeting</b>	– A stakeholders' meet chaired by Shri Sarbananda Sonowal in <b>Kerala (July 2024)</b> strategized the promotion of lighthouse tourism and revitalization of these structures as vibrant tourist destinations.
<b>Sagarmala Programme</b>	– A national program leveraging India's coastline and waterways to promote economic development through projects like <b>coastal circuits, cruise tourism infrastructure, and lighthouse development</b> .
<b>Swadesh Darshan Scheme</b>	– Provides financial assistance for developing tourism infrastructure in <b>state and UT-administered areas</b> . Includes the <b>Coastal Circuit</b> as a thematic focus and a <b>Challenge-Based Destination Development</b> sub-scheme.
<b>Incredible India Campaign</b>	– A flagship initiative under the Ministry of Tourism to promote India as a global tourist destination, highlighting its diverse heritage, including coastal and maritime attractions like lighthouses.
<b>National Heritage Complex Development</b>	– Focuses on preserving and promoting heritage sites, integrating lighthouses into broader national efforts to conserve cultural landmarks.
<b>National Strategy for Sustainable Tourism</b>	– Aims at sustainable tourism by emphasizing <b>environmental sustainability, resource efficiency</b> , and long-term management practices for tourism destinations, including lighthouses.
<b>75 Lighthouses Development</b>	– <b>75 iconic lighthouses</b> were developed with amenities such as <b>museums, amphitheaters, and parks</b> in <b>February 2024</b> with a <b>₹60 crore investment</b> , underlining their cultural and recreational significance.
<b>Future National Framework</b>	– Plans are underway to establish a <b>national framework</b> aimed at empowering coastal communities and promoting sustainable development around lighthouses.

## THE POTENTIAL OF LIGHTHOUSE TOURISM IN INDIA

**Scenic Locations:** Positioned along India's vast coastline and remote islands, many lighthouses provide stunning panoramic sea views, making them ideal for nature enthusiasts and photographers.

**Historical Significance:** Some lighthouses date back centuries and are situated near UNESCO World Heritage Sites such as Mahabalipuram in Tamil Nadu, enhancing their cultural and architectural appeal.

**Adventure and Recreation:** These sites can host activities such as trekking, boating, and water sports, catering to adventure seekers and families alike.

**Economic Growth:** Developing lighthouse tourism creates employment opportunities in hospitality, transportation, and local handicrafts, fostering regional economic development.

**Government Initiative:** Recognizing their potential, the government has identified lighthouse tourism



as a priority area under its Maritime India Vision (MIV) 2030 and Amrit Kaal Vision 2047.

**Modern Facilities:** In February 2024, PM Narendra Modi inaugurated 75 lighthouses equipped with tourist facilities, including museums, amphitheaters, children’s parks, and more, with a ₹60 crore investment.

**Tourist Footfall:** The dedicated lighthouses attracted 16 lakh visitors in 2023-24, a significant rise from 4 lakh visitors in 2014, reflecting a 400% increase. By September 2024, over 10 lakh tourists had already visited in the current fiscal year.

**Sustainable Tourism:** The initiative promotes sustainable tourism practices by preserving the historical and ecological integrity of lighthouses while enhancing their appeal as global travel destinations.

**HURDLES LIMITING THE REALIZATION OF LIGHTHOUSE TOURISM POTENTIAL IN INDIA**

- **Infrastructure Limitations:** Many lighthouses are in remote areas with poor connectivity, like Kochi and Sundarbans, limiting access and footfall. This reduces tourism potential and revenue generation.
- **Environmental Concerns:** Tourism development can negatively impact fragile ecosystems, as seen at Alappuzha Lighthouse in Kerala. The surrounding backwaters face ecological threats from infrastructure.

**WAYS TO TAP THE POTENTIAL OF LIGHTHOUSE TOURISM IN INDIA**

- **Lack of Awareness:** Lighthouse tourism gained momentum after the 2023 Indian Lighthouse Festival, showing prior low awareness. This limits tourist interest and growth potential.
- **Regulatory Issues:** Strict security measures at sites like Mangalore Lighthouse restrict public access. These regulations hinder tourist engagement and development.
- **Coastal Community Involvement:** In places like Goa, local communities weren’t initially involved in tourism planning, limiting their benefits. Tourism revenue wasn’t reinvested into community development.
- **Seasonal Tourism Impact:** Lighthouse tourism in coastal regions faces seasonal fluctuations, as seen in Odisha. Off-season declines affect profitability and operational sustainability.
- **Insufficient Skill Development:** Limited skill-building programs in Tamil Nadu prevent locals from benefiting from tourism growth. Lack of hospitality and guiding skills restricts job opportunities.
- **Private Sector Challenges:** High investment costs and risks deter private players, as in the Sundarbans. Developing tourism infrastructure in ecologically sensitive areas faces slow progress.
- **Heritage Conservation:** Balancing preservation with modern tourism at Kanyakumari Lighthouse is challenging. The need for new facilities conflicts with maintaining the structure’s historical integrity.

Strategy	Details
Sustainable Development	– Emphasis on <b>eco-friendly practices</b> to protect fragile coastal ecosystems and ensure the long-term viability of lighthouse tourism.
Integration with Coastal Circuits	– Lighthouses are integrated into <b>broader coastal tourism circuits</b> to enhance their appeal and connect them with other cultural and natural landmarks.
Awareness Campaigns	– Launching <b>digital initiatives</b> and campaigns to showcase lighthouse destinations, targeting both domestic and international audiences.
Skill Development	– Introducing <b>training programs</b> to equip local communities with skills for employment in <b>hospitality and tourism-related sectors</b> , fostering local economic growth.

Strategy	Details
Alignment with “Atmanirbhar Bharat”	– Aligning lighthouse tourism development with <b>Prime Minister Modi’s “Atmanirbhar Bharat”</b> vision to foster self-reliant India, integrating maritime heritage into the nation’s economic growth strategy.
Preservation of Maritime Biodiversity	– Focus on <b>preserving the environment</b> surrounding lighthouses, protecting India’s rich <b>maritime biodiversity</b> while promoting tourism.
Experiential and Off-the-Beaten-Path Travel	– Catering to the growing demand for <b>experiential tourism</b> by offering tourists the opportunity to engage with local cultures, enjoy scenic landscapes, and participate in activities around lighthouses.
Lighthouse Festivals and Community Engagement	– Organizing <b>Indian Lighthouse Festivals</b> and <b>Stakeholders Meetings</b> to bring together local communities, tourism operators, and government bodies, fostering a sense of ownership and pride while benefiting local economies.
MIV 2030 Integration	– Incorporating lighthouse tourism into the <b>Maritime India Vision 2030 (MIV 2030)</b> initiative, linking lighthouses with larger coastal tourism circuits to boost global appeal.

**CONCLUSION:**

The government’s ongoing efforts to develop lighthouse tourism are already yielding significant results, with millions of tourists visiting these iconic sites. By combining history, adventure, and natural beauty, lighthouses are becoming an integral part of India’s tourism landscape. The focus on sustainable development, community engagement, and environmental preservation ensures that lighthouse tourism will continue to drive economic growth in India’s coastal regions.

**PRELIMS QUESTION:**

Q. Which of the following are the advantages of the Lighthouse tourism?

1. Employment generation
2. Sustainable coastal tourism
3. Elimination of involvement of local communities.

Select the correct answer using the code given below:

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

ANSWER: A

**MAINS QUESTION:**

Q. Discuss the potential and significance of lighthouse tourism in India. What measures have been taken by the government to tap into the potential of lighthouse tourism and enhance its contribution to the economy and sustainable development?

(Answer in 250 words)

## STARTUP NATION: INDIA

### WHY IN THE NEWS?

India has emerged as the 3rd largest startup hub globally, with over 100 unicorns and more than 73,000 startups recognized under the Startup India Initiative. Notably, nearly half of these startups have a woman director, highlighting the growing role of women in driving innovation and economic growth. Cities like Bengaluru, Hyderabad, Mumbai, and Delhi-NCR are now innovation epicentres fueled by affordable internet and a dynamic, young workforce. Indian startups are also at the forefront of adopting technologies like AI, blockchain, and IoT to solve global and local challenges. This ecosystem is rapidly transforming India into a global leader in entrepreneurship and innovation.



### WHAT IS A STARTUP IN INDIA?

In India, a startup refers to a newly established business that is focused on developing innovative products or services, often with a scalable business model. To be officially recognized as a “startup” under the Indian government’s Startup India initiative, the company must meet certain criteria.

- 1. Age:** The business must be no more than 10 years old from the date of incorporation.
- 2. Type:** It must be a Private Limited Company, Limited Liability Partnership (LLP), or partnership firm.
- 3. Annual Turnover:** The startup’s annual turnover should not exceed Rs. 100 crore in any financial year since its incorporation.

- 4. Innovation:** The company should focus on developing or improving innovative products, services, or processes.
- 5. Scalability:** The business model should be scalable, with the potential to create wealth and employment.
- 6. Original Entity:** The startup must not be formed by splitting or reconstructing an existing business.

### GOVERNMENT SUPPORT TO BOOST START-UPS:

#### 1. Startup India Program (Launched in 2016):

- a. Ease of Doing Business:** Simplifies compliance with self-certification, single-window clearances, and reduced regulatory hurdles.
- b. Tax Benefits:** Startups enjoy tax exemptions for three consecutive years, easing financial pressure and promoting reinvestment.
- c. Fund of Funds for Startups (FFS):** ₹10,000 crore fund allocated to support early-stage startup funding.
- d. Sector-Specific Policies:** Tailored policies for industries like biotechnology, agriculture, and renewable energy to drive growth and job creation.
- e. BHASKAR:** A platform facilitating collaboration between startups, investors, mentors, and government bodies to streamline operations and access resources.

#### 2. Atal Innovation Mission (AIM):

AIM aims to foster innovation through a network of Atal Tinkering Labs and Atal Incubation Centers, providing infrastructure and resources to promote entrepreneurship and innovation at the grassroots level.

**3. National Initiative for Developing and Harnessing Innovations (NIDHI):** NIDHI provides financial and infrastructural support to budding innovators, helping them scale their ideas into sustainable startups.

#### 4. **Startup Accelerator of MeitY for Product Innovation, Development, and Growth (SAMRIDH):**

Launched in 2021, this scheme supports software product startups with up to ₹40 lakh in funding through accelerators, aiding in product development and business growth.

**5. Tax Exemption on Investment:** Startups in India can avail of tax exemptions on investments received from angel investors or venture capitalists, making it more attractive for investors to fund early-stage startups.

**6. Public Procurement:** The government has mandated that 25% of its procurement should come from startups, providing them with a steady market and a chance to scale their businesses.

**7. Ease of Access to Funding:** The government has facilitated easier access to venture capital and private equity investments by simplifying the funding process and creating a more transparent environment.

#### **STARTUP ROLE IN INDIA'S ECONOMIC DEVELOPMENT:**

- 1. Employment Generation:** With over 1.6 million jobs created, startups have become key contributors to employment across the country, offering diverse opportunities in various sectors.
- 2. GDP Growth:** By fostering innovation and boosting productivity, startups contribute directly to India's GDP. They also stimulate the growth of ancillary industries, further expanding economic impact.
- 3. Attracting Foreign Investments:** India has emerged as a hub for global venture capital (VC) and private equity (PE) investments, attracting substantial foreign funding and boosting the overall investment climate.
- 4. Promoting Inclusivity:** Many startups, especially in rural areas, are addressing critical challenges in sectors like healthcare, education, and agriculture. By creating social enterprises, these startups enhance the quality of life for millions, promoting inclusive development across the country.

**5. Technology Adoption:** Startups are at the forefront of adopting cutting-edge technologies such as AI, blockchain, and IoT, driving digital transformation and improving efficiency in various industries.

**6. Fostering Innovation Ecosystem:** Through incubators, accelerators, and collaborations, startups contribute to a vibrant innovation ecosystem, nurturing ideas and solutions that benefit local and global markets.

**7. Supporting Sustainability:** Many startups are focused on developing sustainable business models and products, particularly in clean energy, waste management, and environmental conservation, promoting long-term environmental and economic benefits.

#### **CHALLENGES FACED BY START-UPS IN INDIA:**

- 1. Funding Constraints:** While the government and private investors have made substantial efforts to support startups, access to funding, especially for early-stage startups, remains a significant challenge.
- 2. Regulatory and Compliance Burdens:** Although initiatives like the Startup India Program have simplified some processes, startups still face complex regulatory frameworks, especially in sectors like finance and healthcare.
- 3. Talent Acquisition and Retention:** Finding skilled talent, particularly in emerging technologies such as AI, blockchain, and data science, is challenging.
- 4. Market Access and Competition:** Startups often struggle to reach a broad customer base and compete with well-established players in the market. Building brand recognition and gaining customer trust can be time-consuming and costly.
- 5. Infrastructure and Resources:** Despite the growth of incubators and accelerators, many startups in smaller cities or rural areas still face limited access to the infrastructure, technology, and mentorship needed for growth.



- 6. Cultural Barriers:** In some regions, the mindset around entrepreneurship is still evolving. Risk-averse attitudes and a lack of encouragement for failure can deter individuals from pursuing entrepreneurial ventures.

#### WAY FORWARD:

- 1. Enhancing Access to Funding:** Expand funding options through angel networks, crowdfunding platforms, and government-backed schemes, particularly for early-stage startups. Increase venture capital investment in emerging sectors like clean tech, agri-tech, and deep tech to fuel innovation.
- 2. Simplifying Regulations:** Streamline regulatory processes, reduce delays in approvals, and create a more startup-friendly legal and tax environment to encourage ease of doing business.
- 3. Fostering Collaboration with Corporates:** Facilitate corporate partnerships with startups to provide market access, resources, and expertise. Develop more incubators and accelerator programs to nurture these collaborations.
- 4. Building a Skilled Workforce:** Align academic curriculums with industry needs, and create partnerships between educational institutions, industry, and startups to develop specialized training and internship programs.
- 5. Promoting Rural and Inclusive Innovation:** Strengthen infrastructure and resources in tier-2 and tier-3 cities. Support rural-focused and women-led startups to foster inclusive and grassroots innovation.
- 6. Developing Innovation in Emerging Sectors:** Focus on sectors like biotechnology, clean energy, and sustainability, with dedicated policies and funding to create next-gen technologies.
- 7. Supporting Sustainable Startups:** Promote eco-friendly startups in clean energy, waste management, and sustainable agriculture.

Encourage socially responsible businesses that address healthcare, education, and rural development.

#### CONCLUSION

India's startup ecosystem has seen tremendous growth, emerging as one of the largest in the world. Government initiatives like Startup India have played a pivotal role in simplifying processes, providing funding support, and creating sector-specific policies to fuel innovation. Startups have contributed significantly to job creation, GDP growth, foreign investments, and social inclusivity, driving the country toward becoming a global leader in entrepreneurship. challenges such as funding constraints, regulatory hurdles, talent acquisition, market competition, and infrastructure gaps remain. Despite these hurdles, India's startup landscape continues to evolve, with an increasing number of women-led startups and a rapidly growing innovation ecosystem. With sustained government support and entrepreneurial determination, startups are set to play an even greater role in India's economic development in the years to come.

#### PRELIMS QUESTION:

**Q. Which of the following is NOT a criterion for a business to be recognized as a "startup" under the Indian government's Startup India initiative?**

- The business must be no more than 10 years old from the date of incorporation.
- The business must be a Private Limited Company, LLP, or partnership firm.
- The annual turnover must exceed Rs. 100 crore.
- The business should focus on developing innovative products, services, or processes.

**Answer: C**

### Mains Question:

**Q. Critically evaluate the role of India's startup ecosystem in the country's economic development, highlighting key government initiatives, challenges faced by startups, and strategies for future growth.**

**(250 words, 15 marks)**

### INDIA'S ROLE IN GLOBAL GREENHOUSE GAS EMISSION REDUCTION EFFORTS

#### WHY IN THE NEWS?

India's greenhouse gas emissions fell by 7.93% in 2020, as reported in the country's fourth Biennial Update Report (BUR-4) to the UNFCCC. Despite this decline, total emissions rose by 98.34% since 1994. The report reveals a 36% drop in emission intensity from 2005 to 2020. India is on track to meet its 2030 climate goals, including reducing GDP emission intensity by 45% and achieving 50% of electric power capacity from non-fossil fuels. While emissions from energy, agriculture, and industry remain significant, India is striving to decouple economic growth from carbon emissions.



#### WHAT IS GREENHOUSE GAS?

A greenhouse gas (GHG) is a gas in the Earth's atmosphere that traps heat, contributing to the greenhouse effect, which keeps the planet warm enough to support life. These gases absorb infrared radiation (heat) emitted from the Earth's surface and re-radiate it back, preventing it from escaping into space. This natural process helps maintain temperatures that are conducive to life on Earth.

#### Key achievements:

- 1. Global Emissions Decline (2020):** 7.6% drop in global GHG emissions due to COVID-19. 2.4 billion tons reduction in CO<sub>2</sub> emissions.
- 2. India's Emission Intensity:** 36% decrease in GDP emission intensity (2005-2020). 7.93% reduction in national emissions in 2020.
- 3. Global Carbon Intensity:** 40% reduction in carbon intensity (1990-2020), showing economic decoupling from emissions.
- 4. Renewable Energy Growth:** Global renewable capacity surpassed 2,800 GW (29% of global electricity). Solar power capacity reached 1,000 GW by 2023.
- 5. Methane Emissions:** Over 100 countries pledged to reduce methane emissions by 30% by 2030.
- 6. Carbon Capture & Storage (CCS):** 30+ large-scale CCS projects capture 40 million tons of CO<sub>2</sub> annually.
- 7. International Climate Agreements:** The Paris Agreement (2015) aims to limit warming to 1.5°C. 130 countries committed to net-zero emissions by 2050.
- 8. Ozone-Depleting Substances:** The Montreal Protocol reduced the use of harmful chemicals by 99%.

#### STEPS WERE TAKEN TO REDUCE GHG:

- 1. Use Renewable Energy:** Switch to renewable energy sources like solar, wind, and hydroelectric power to reduce reliance on fossil fuels.
- 2. Reduce Energy Use:** Lower energy consumption by using energy-efficient appliances, turning off lights, adjusting heating and cooling, and using less hot water.
- 3. Reduce Transportation Emissions:** Walk, bike, use public transportation, or drive less. Opt for fuel-efficient or electric vehicles.

4. **Reduce Waste:** Recycle, reuse, repair, and minimize waste generation to lower emissions associated with landfills.
5. **Eat Less Meat:** Reducing meat consumption, especially red meat, can lower methane emissions from livestock and reduce your carbon footprint.
6. **Use Carbon Capture and Storage (CCS):** Implement CCS technology to capture and store CO<sub>2</sub> emissions from power plants and industrial activities.
7. **Use Energy-Efficient Products:** Invest in energy-efficient products, such as LED bulbs, efficient appliances, and home insulation, to reduce energy consumption.
8. **Plant a Tree:** Planting trees helps absorb CO<sub>2</sub> from the atmosphere, reducing overall GHG emissions.

#### STILL, A LONG WAY TO GO:

1. **Global Emissions Continue to Rise:** Despite efforts, global emissions have continued to rise, with countries like China and India seeing increased emissions due to rapid industrialization and growing energy demands.
2. **Insufficient Renewable Energy Transition:** Renewable energy adoption is growing, but fossil fuels still account for a large portion of global energy consumption. A faster transition to solar, wind, and other renewable sources is essential.
3. **Unprecedented Emissions from Transportation:** The transportation sector remains one of the largest sources of emissions, with many countries still heavily reliant on gasoline and diesel vehicles. Transitioning to electric vehicles (EVs) needs to accelerate.
4. **Deforestation and Land Use:** Deforestation continues at alarming rates, particularly in the Amazon and Southeast Asia. This reduces the planet's ability to absorb CO<sub>2</sub> and disrupts ecosystems.

5. **Inequitable Climate Actions:** Many developing nations face challenges in adopting cleaner technologies due to financial and infrastructural limitations. Climate change impacts disproportionately affect these regions, often making it harder for them to invest in mitigation strategies.
6. **Carbon Capture Technology Limitations:** While carbon capture and storage (CCS) holds promise, it is still in the early stages and faces technical, economic, and environmental hurdles.
7. **Political and Economic Barriers:** Despite international agreements like the Paris Agreement, political will to implement policies for reducing emissions can be inconsistent.

#### WAY TO ACHIEVE NET ZERO IN 2070:

1. **Decarbonize Energy:** Shift to renewables (solar, wind, hydro). Invest in energy storage and nuclear power.
2. **Electrify Transport:** Promote electric vehicles (EVs) and build charging infrastructure. Electrify public transportation and use alternative fuels for aviation and shipping.
3. **Improve Energy Efficiency:** Enforce energy efficiency in buildings and industry. Promote circular economy practices.
4. **Carbon Capture & Removal:** Scale up CCS and direct air capture technologies. Invest in afforestation and soil carbon sequestration.
5. **Sustainable Agriculture:** Reduce methane emissions from farming. Promote plant-based diets and regenerative farming.
6. **Green Finance & Incentives:** Implement carbon pricing and invest in clean technologies.
7. **Global Collaboration:** Strengthen climate agreements and facilitate technology transfer to developing countries.
8. **Education & Public Awareness:** Increase climate education and promote sustainable lifestyles.

## CONCLUSION

Achieving net-zero emissions by 2070 requires significant, concerted global efforts. Despite progress, such as India's 7.93% emissions reduction in 2020 and growth in renewable energy, global emissions continue to rise, driven by sectors like energy, transportation, and deforestation. To meet the net-zero goal, the world must rapidly decarbonize energy systems by shifting to renewable sources and nuclear power, electrify transportation through electric vehicles and public transit, and improve energy efficiency across buildings, industries, and agriculture. Additionally, scaling up carbon capture technologies, promoting sustainable agricultural practices, and fostering green finance and international collaboration are crucial. Achieving this ambitious target will demand immediate and sustained action across all sectors to create a sustainable, low-carbon future for generations to come.

## PRELIMS QUESTION:

**Q. Which of the following is true regarding India's greenhouse gas emissions and climate goals?**

1. India reduced its greenhouse gas emissions by 7.93% in 2020.
2. India aims to achieve net-zero emissions by 2050.
3. India's GDP emission intensity decreased by 36% between 2005 and 2020.

**Select the correct answer using the code below:**

- A. 1 and 3 only
- B. 2 and 3 only
- C. 1, 2, and 3
- D. 1 only

**Answer: A**

## Mains Question:

**Q. India's greenhouse gas emissions have shown a reduction of 7.93% in 2020, but the nation still faces challenges in achieving its 2030 climate goals. Discuss the steps India can take to achieve net-zero emissions by 2070 and the role of global collaboration in this process.**

**(250 words, 15 marks)**

## INDIA TARGETS SPACE DOCKING MILESTONE WITH ISRO'S SPADEX MISSION

### WHY IN THE NEWS?

The Indian Space Research Organisation (ISRO) is set to achieve a groundbreaking milestone with its SpaDeX mission, aiming to dock or merge two satellites in space. This rare and challenging feat has only been accomplished by a few countries, and India is now preparing to join their ranks. The mission will utilize the indigenous "Bharatiya Docking System," a significant technological advancement for the country. Union Minister Dr Jitendra Singh highlighted the importance of SpaDeX in showcasing India's capabilities in space technology, which will also be crucial for future missions, including the Indian space station and Gaganyaan. The successful docking of two satellites will solidify India's growing role in global space exploration.





**INDIAN AND SPADEX MISSION:**

The SpaDeX Mission (Space Docking Experiment), led by ISRO, aims to demonstrate in-space docking technology, a crucial capability for future space missions. This mission involves two small spacecraft, SDX01 (Chaser) and SDX02 (Target), each weighing 220 kg, designed to dock and undock autonomously in low Earth orbit (LEO) at an altitude of 470 km.

Category	Details
<b>Key Features</b>	
Indigenous Docking System	Both spacecraft use the Bharatiya Docking System (BDS), allowing either spacecraft to act as the Chaser or Target.
Autonomous Operations	Advanced algorithms manage docking and rendezvous processes autonomously, aided by AI for real-time decision-making.
Power Transfer	Demonstrates the ability to transfer electrical power between docked spacecraft, which is crucial for satellite servicing and space robotics.
Navigation and Control	Uses a GNSS-based positioning system for precise control and AOCS to maintain stability during critical operations.
<b>Significance</b>	
Global Leadership	Positions India among a select group of countries mastering docking technology, enhancing ISRO’s role in global space exploration.
Future Missions	Essential for future projects like the Bharatiya Antriksh Station, human spaceflight missions (Gaganyaan), and lunar or interplanetary missions.
Satellite Servicing	Key for extending satellite lifespans through refuelling and repair in orbit.
<b>Launch Details</b>	
Launch Vehicle	PSLV-C60 (Polar Satellite Launch Vehicle) is a reliable and versatile rocket.
Launch Site	Satish Dhawan Space Centre (SDSC) in Sriharikota, India.
Launch Date	December 30, 2024.

**WHAT IS SPACE DOCKING?**

Space docking is the process by which two spacecraft or modules connect or attach to each other while in space. This technology allows spacecraft to join together in orbit to achieve specific objectives. The docking process typically involves one spacecraft (the Chaser) approaching and aligning itself with another spacecraft or station (the Target) to connect physically.

**1. Assembly of Space Stations:** Docking is key to building large structures in space, such as space stations, where multiple modules are launched separately and then docked together in orbit.

- 2. Satellite Servicing:** Docking enables spacecraft to connect with satellites for refuelling, repairs, or upgrades in orbit, extending the satellite’s operational life without needing to launch replacements.
- 3. Crew Transfer:** For human spaceflight missions, docking allows astronauts to transfer between spacecraft or between a spacecraft and a space station.
- 4. Resource Sharing:** Docked spacecraft can transfer supplies, power, and data, supporting long-term missions like deep-space exploration.

## HOW IS SPACE DOCKING CARRIED OUT

Space docking is a complex process where two spacecraft connect in orbit, either automatically or manually, for tasks like crew transfer or resupply.

1. **Rendezvous:** One spacecraft (the chaser) adjusts its orbit to approach the target spacecraft, matching speed and position for alignment.
2. **Approach:** The chaser fine-tunes its position to get close to the target (usually within 10-50 meters), using onboard sensors for navigation.

### 3. Docking:

**Automated Docking:** Systems like the Kurs or IDSS guide the spacecraft into the docking port using sensors, lasers, and cameras.

**Manual Docking:** Crew manually controls the approach using thrusters and cameras, a technique used in early missions.

4. **Latching:** The docking mechanisms engage, securing the spacecraft together. Pressure equalization and sealing ensure safety.
4. **Post-Docking:** Systems are checked for secure connections and communication links. Crew or cargo may transfer between spacecraft.
4. **Undocking:** If needed, spacecraft disengage using thrusters and safely separate.

## SIGNIFICANCE OF THE SPACE DOCKING:

1. **Crew Transfer:** Docking allows astronauts to move between spacecraft, such as from the SpaceX Dragon or Soyuz to the International Space Station (ISS), supporting long-duration missions.
2. **Resupply and Maintenance:** Docking facilitates the delivery of cargo, scientific equipment, and fuel to space stations, such as the ISS, enabling ongoing research and station upkeep.
3. **International Collaboration:** It enables countries to work together in space, as seen in the Apollo-Soyuz Test Project and the ISS, where

spacecraft from different nations dock for joint missions.

4. **Scientific Research:** Docking enables the transfer of crew and equipment to space labs, allowing for continuous scientific experiments and space station operations.
5. **Support for Deep-Space Exploration:** For future missions to the Moon, Mars, or beyond, docking will be critical for assembling spacecraft, transferring supplies and crew, and ensuring mission success.
6. **Automated Systems and Safety:** With automated docking systems, space missions become more efficient, reducing the need for manual labour and improving safety during docking operations.

## CHALLENGES IN SPACE DOCKING:

1. **Precision and Navigation:** Docking requires extremely precise maneuvering. Even slight misalignments can cause failure, so accurate navigation, guidance, and control systems are essential to ensure safe docking.
2. **Relative Motion:** Spacecraft must approach each other in orbit while moving at high speeds (up to 28,000 km/h). Small errors in speed or trajectory can lead to a collision or missed docking. Automated docking systems rely on advanced sensors (such as cameras, radar, and lasers) to guide spacecraft into place.
3. **Automation and Sensors:** These sensors must function flawlessly in the absence of atmospheric reference points and handle potential interference or failures.
4. **Mechanical Compatibility:** Different spacecraft may use different docking mechanisms. Ensuring compatibility between spacecraft, such as between the Russian Soyuz and American spacecraft, requires custom adapters or universal standards like the International Docking System Standard (IDSS).
5. **Pressure Sealing:** After docking, ensuring airtight seals is critical for crew safety. Any

failure in the docking ring or seals can lead to leaks, compromising the pressure inside the spacecraft.

6. **Environmental Hazards:** Spacecraft must account for various space hazards, including micrometeoroids, space debris, and radiation. These factors can pose risks to the docking process and equipment integrity.
7. **Crew Coordination:** In manual docking, astronauts must rely on visual cues and instruments to safely guide the spacecraft into position, requiring high skill and coordination, especially in challenging conditions like low-light or zero gravity.

#### WAYS TO CARRIED OUT SPACE DOCKING IN A PROPER MANNER:

1. **Precise Rendezvous:** Accurate calculations and continuous monitoring of position and speed ensure a safe approach.
2. **Advanced Navigation:** Automated docking systems use sensors (radar, lidar, cameras) to guide spacecraft, with manual control as a backup.
3. **Docking Compatibility:** Standardized systems like IDSS ensure spacecraft from different nations can dock seamlessly.
4. **Sensor Integration:** High-precision sensors enable accurate final alignment for safe docking, accounting for space environment factors.
5. **Controlled Approach:** Spacecraft approach at low speeds with finely tuned thrusters to prevent damage.
6. **Pressure Integrity:** Secure, airtight seals are ensured using locking mechanisms and leak testing post-docking.
7. **Communication:** Continuous communication between spacecraft and crew ensures coordinated manoeuvres.

#### CONCLUSION

The SpaDeX mission marks a major technological achievement for India. By mastering space docking, ISRO will not only enhance its capability to carry out satellite servicing and interplanetary exploration but also strengthen its role in global space missions. The advancements demonstrated in this mission will be foundational for India's future space exploration endeavours, ensuring long-term sustainability and growth in space activities.

#### PRELIMS QUESTION:

##### Q. Consider the following statements:

1. The SpaDeX mission is led by the Indian Space Research Organisation (ISRO) to demonstrate in-space docking technology.
2. The SpaDeX mission involves two large spacecraft, each weighing over 500 kg.
3. The docking technology used in the SpaDeX mission is the Bharatiya Docking System (BDS), developed indigenously by ISRO.

**How many of the statements given above are correct?**

- A. Only one
- B. Only two
- C. All three
- D. None

**Answer: A**

#### MAINS QUESTION:

**Q. Explain the significance of the SpaDeX mission for India's space exploration capabilities and its implications for future space missions.**

**(250 words, 15 marks)**