

GS PAPER - 3- ENVIRONMENTAL POLLUTION & DEGRADATION-CLIMATE CHANGE
Data Authenticity to Fight Air Pollution

As India grapples with a worsening air pollution crisis, the strategic deployment of air quality monitoring infrastructure has come under scrutiny. The Delhi government's decision to install **six new Continuous Ambient Air Quality Monitoring Stations (CAAQMS) in relatively low-pollution, low-density areas like JNU and Delhi Cantonment**, rather than high-pollution zones like Anand Vihar, have raised concerns about data integrity. With air pollution causing 1.67 million premature deaths annually in India (Lancet, 2020), this editorial examines the significance of transparent monitoring for India's pollution control efforts and the challenges hindering progress.

What are the Critical Challenges in India's Air Quality Monitoring Framework?

- **Misplacement of Monitoring Infrastructure:** The placement of CAAQMS in low-pollution areas, creates a **skewed picture of air quality**, masking the severity of pollution in hotspots like Okhla (Noida).
 - This **"data dressing" not only misleads policymakers but also erodes public trust**, as citizens in polluted areas face unaddressed health risks.
 - For instance, **Anand Vihar's AQI reached 426 in November 2023, while Delhi Cantonment recorded 172, illustrating the disparity.**
- **Institutional and Technical Limitations:** India's air quality monitoring network, with over **1,000 stations, is extensive** (installation and operation of a CAAQMS can cost up to Rs.1 crore) but faces operational challenges.
 - **Many CAAQMS suffer from downtime due to power outages or poor maintenance**, reducing data reliability.
 - The Delhi Pollution Control Committee (DPCC), **tasked with overseeing monitoring, is understaffed**, with only **few environmental engineers for a city of over 30 million people**, limiting enforcement and calibration efforts.
- **Lack of Public Engagement:** Public awareness of air quality data remains low, with limited efforts to educate citizens on interpreting AQI or adopting protective measures.
 - Without community involvement, initiatives like NCAP struggle to gain traction. The **absence of accessible, real-time data platforms** further disconnects citizens from the pollution crisis, reducing pressure on authorities to act decisively.
- **Geopolitical and Regional Factor:** Air pollution in Delhi is exacerbated by regional factors, such as **stubble burning in Punjab and Haryana, which contribute 24% of PM2.5** during winter (IIT-K, 2024).
 - Inadequate monitoring in rural and peri-urban areas limits the ability to address transboundary pollution, complicating coordinated action under the Commission for Air Quality Management (CAQM).

What is the Significance of Transparent Air Quality Monitoring?

- **Public Health Protection:** Air pollution, particularly PM2.5, is a major public health threat, contributing to about a million and a half deaths every year from 2009 to 2019 (Lancet).
 - High-pollution areas (like Anand Vihar) where AQI often exceeds 400, expose vulnerable populations—children, elderly, and low-income communities—to respiratory and cardiovascular risks.
 - Strategic placement of CAAQMS in such zones provides real-time data, enabling targeted interventions like anti-smog guns or traffic controls, which can mitigate health impacts.
- **Evidence-Based Policymaking:** Accurate air quality data is the cornerstone of effective environmental governance. The **National Clean Air Programme (NCAP), aiming to reduce particulate matter by 40% by 2026 (2019-20 as the base year)**, relies on reliable data to design city-specific action plans.
 - Misplaced monitors, as seen in Delhi, distort AQI readings, **undermining policies like the Graded Response Action Plan (GRAP)** and delaying action against polluters in industrial or traffic-heavy areas.
- **Economic Efficiency:** Air pollution costs India **3% of its GDP annually** due to healthcare expenses and lost productivity (World Bank, 2022).
 - Each CAAQMS, **priced at over Rs.1 crore**, represents a significant public investment. **Deploying these in high-pollution zones maximizes their impact**, ensuring resources are used to address critical areas **rather than generating misleadingly optimistic data** from green zones like Delhi Cantonment, where AQI is often 100 points lower than Anand Vihar.

What is the State and Impact of Air Pollution in India?

- **Air Pollution in India:** According to the World Air Quality Report 2024 by IQAir, **India is the 5th most polluted country**, with an average PM2.5 level of **50.6 µg/m³, 10 times the WHO safe limit (5 µg/m³)**.
 - **Delhi remains the most polluted capital**, while Bymihat (Assam-Meghalaya border) is the world's most polluted city.
 - **India dominates the global pollution list**, with 6 of the top 10 and 13 of the top 20 most polluted cities.
 - **Globally, WHO reports that 99% of the population breathes polluted air**, with low- and middle-income countries most affected.

Impact of Air Pollution:

- **Health Impact:** In 2021, **air pollution caused 8.1 million deaths globally**, with India (2.1 million) and China (2.3 million) being the worst affected (State of Global Air Report 2024).
 - Health impacts include respiratory infections, lung diseases, chronic obstructive pulmonary disease (COPD), asthma, cardiac arrest, and gastrointestinal issues.

- **Economic Loss:** Air pollution **lowers GDP growth (3%)** by reducing productivity, increasing health costs, and decreasing asset efficiency.
- **Reduced Solar Efficiency:** Air pollution reduces solar power efficiency by **blocking radiation, while rising temperatures lower photovoltaic performance.**
 - By 2041-2050, India's solar panel efficiency may drop by 2.3%, causing an annual loss of at least 840 GWh of electricity.
- **Environmental Degradation:** Air pollution accelerates **climate change by increasing greenhouse gases**, degrades ecosystems through acid rain and toxin buildup, and threatens biodiversity.
 - It weakens **plants by excess nitrogen deposition** and reduces crop yields by impairing photosynthesis due to ozone pollution.

What Measures Have Been Taken to Control Air Pollution in India?

- National Clean Air Programme (NCAP)
- System of Air Quality and Weather Forecasting and Research (SAFAR) Portal
- Graded Response Action Plan (for Delhi)
- **For Reducing Vehicular Pollution:**
 - BS-VI Vehicles
 - Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME)
- Pradhan Mantri Ujjwala Yojana (PMUY)
- Commission for Air Quality Management in the NCR

In *M.C. Mehta vs. Union of India*, the Supreme Court treated the right to live in a pollution free environment as a **part of fundamental right to life under Article 21 of the Constitution.**

What Measures can India Adopt in Strengthening Air Quality Monitoring?

- **Strategic Deployment of CAAQMS:** India must **prioritize installing CAAQMS and other air quality monitoring devices** in high-pollution zones using GIS-based pollution mapping to identify hotspots.
 - Collaborating with research institutions can ensure data-driven site selection, maximizing the impact of monitoring investments.
- **Enhancing Institutional Capacity:** Increasing **funding and staffing for DPCC and State Pollution Control Boards (SPCBs) is critical.**
 - Training programs in advanced monitoring technologies and data analytics can improve operational efficiency and ensure consistent data quality.
- **Promoting Data Transparency:** India should **revamp its public platforms and develop an independent platform for pollution related data** (like Judicial Grid) for real-time, unfiltered AQI data, to prevent manipulation.
 - **Revamping initiatives like the Sameer app of CPCB** can be scaled up to provide localized pollution alerts, empowering citizens to demand accountability.
- **Fostering Regional Cooperation:** Strengthening CAQM's mandate to **coordinate with neighboring states can address transboundary pollution.**
 - Incentives for farmers to **adopt alternatives to stubble burning (like Pusa Decomposer and biomass decomposition for biogas)**, coupled with rural monitoring stations, can tackle regional disparities.
- **Leveraging Technology and Innovation:** Integrating **low-cost sensor networks and satellite-based monitoring can complement CAAQMS**, expanding coverage to underserved areas.
 - Partnerships with startups developing AI-driven pollution forecasting tools can enhance predictive capabilities, aiding proactive interventions.

GS PAPER - 2- GOVERNMENT POLICIES & INTERVENTIONS- WELFARE SCHEMES

Active Empowerment of Specially-abled in India

Tamil Nadu's landmark legislation guaranteeing positions for **persons with disabilities across local governing bodies** represents a revolutionary step in inclusive governance by elevating disabled citizens from **marginalized status to community leadership roles.** This first-of-its-kind policy in India creates pathways for dignity and participation that extend beyond **tokenistic inclusion.** In a broader Indian context, it sets a progressive precedent for other states to emulate, reinforcing the **constitutional vision of equality, empowerment, and grassroots democracy.**

What are the Key Provisions in India for the Active Development of Persons with Disabilities?

- **Key Constitutional Provisions:**
 - **Article 14 - Right to Equality:** Guarantees equality before the law and protection from discrimination for all, including PwDs, ensuring equal rights and opportunities.
 - **Article 15 - Prohibition of Discrimination:** Prohibits discrimination, allowing the state to make special provisions for PwDs' welfare.
 - **Article 16 - Equality of Opportunity in Employment:** Provides equal opportunity in public employment and supports job reservations for PwDs in government sectors.
 - **Article 41 - Right to Work and Education:** Directs the state to provide employment, education, and public assistance for PwDs, forming the basis for welfare schemes.
- **Other Provisions:**
 - **Rights of Persons with Disabilities (RPwD) Act, 2016:** The RPwD Act, 2016 is the cornerstone of legal provisions for PwDs in India.

- It expanded the definition of disability to include 21 categories, such as mental illness, autism, and cerebral palsy.
- It provides for a 4% reservation in government jobs for PwDs in all categories, including government departments and public sector enterprises.
 - Additionally, 5% reservation is provided for PwDs in government educational institutions.
- **Accessible India Campaign (Sugamya Bharat Abhiyan):** The Accessible India Campaign, launched in 2015, focuses on creating accessible infrastructure, digital spaces, and services for PwDs.
 - The campaign aims to make public transport, buildings, and government websites more accessible by introducing universal design principles.
- **Deendayal Disabled Rehabilitation Scheme (DDRS):** The DDRS is a flagship scheme under the Ministry of Social Justice and Empowerment that provides grants to Non-Governmental Organizations (NGOs) working in the area of disability rehabilitation.
 - This scheme supports activities related to the rehabilitation of PwDs, such as skill development, vocational training, and awareness programs
- **National Trust for Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation, and Multiple Disabilities:** The National Trust Act, 1999, aims to provide services for persons with specific disabilities, such as autism, cerebral palsy, and mental retardation.

What are the Key Issues Associated with Persons with Disabilities in India?

- **Barriers in Education and Skill Development:** Despite progressive policies like the National Education Policy (NEP) 2020, PwDs continue to face educational exclusion due to lack of accessible infrastructure, inadequate teacher training, and societal stigma.
 - A 2019 report stated that more than one in four children with disabilities between ages 5 and 19 in India have never attended any educational institution
 - This education gap contributes to their exclusion from skilled employment, perpetuating cycles of poverty and marginalization.
- **Lack of Adequate Employment Opportunities:** Despite legislative provisions like the Rights of Persons with Disabilities (RPwD) Act, 2016, there is still a marked gap in employment opportunities for PwDs.
 - Discriminatory hiring practices, inadequate workplace accommodations, and societal stigma hinder their participation in the labour market.
 - According to recent NSS data, only 36% of PwDs are employed, with men (47%) having better chances than women (23%) in securing jobs.
- **Inadequate Accessibility and Infrastructure:** The lack of accessible infrastructure—ranging from transportation to public buildings—remains a critical barrier to social participation for PwDs.
 - Even with the Accessible India Campaign launched in 2015, infrastructure remains largely inaccessible, especially in rural areas.
 - According to a 2018 report by the Department of Empowerment of Persons with Disabilities, only 3% of buildings in India were found to be fully accessible
 - Even where they seek justice, persons with disabilities face exclusion, as courts often lack wheelchairs, proper ramps, and accessible infrastructure, as noted by the Centre for Research and Planning.
- **Healthcare and Rehabilitation Services:** Access to adequate healthcare services and rehabilitation for PwDs is another pressing issue.
 - While schemes like the Deendayal Disabled Rehabilitation Scheme aim to provide support, many PwDs, especially those with severe disabilities, face inadequate healthcare provisions.
 - Recent surveys indicate that around one-fifth (20.32%) of the household's (having PwD) monthly consumption expenditure was spent on out-of-pocket expenditure for disability in India.
- **Social Stigma and Discrimination:** Social stigma and negative societal attitudes towards PwDs are among the most pervasive challenges.
 - These attitudes manifest in discrimination in workplaces, educational institutions, and public spaces.
 - The widespread societal belief that disability equates to incapacity fosters exclusionary practices.
 - For example, the high unemployment rate among women with disabilities illustrates how gender biases, combined with disability, worsen their social and economic exclusion.
- **Unequal Social Security and Welfare Support:** Despite the existence of social security schemes such as the National Disability Welfare Fund, PwDs often do not benefit fully from these programs due to inadequate implementation and lack of awareness.
 - While the RPwD Act mandates reservation in government jobs and educational institutions, compliance remains inconsistent, especially in the private sector.
 - According to the NSS 76th round survey, the percentage of persons with disabilities who received aid/help from Government was just 21.8% and another 1.8% received aid/help from organisations other than Government.
- **Barriers in Access to Technology and Assistive Devices:** The absence of affordable and accessible assistive technologies remains a significant issue for PwDs.

- While technological innovations can enhance independence, their availability remains scarce, especially in rural areas.
- As per the latest data, **less than 10% of PwDs have access to necessary assistive devices**. Moreover, in a country with over 2.68 crore PwDs, the lack of integration of technology in daily life for this **group restricts their ability to access education, work, and even social services**, deepening their exclusion from mainstream society.
- **Limited Participation in Political and Civic Life:** Despite recent strides in political inclusion—like the Tamil Nadu government’s initiative to nominate persons with disabilities to local bodies—**PwDs remain underrepresented in decision-making processes**.
 - The lack of adequate political representation and participation in governance undermines the voices and concerns of this marginalized group.
 - Their limited participation in **civic and political spaces results in policies that often overlook their needs**.

What Measures can India Adopt for Active Empowerment and Inclusion of PwDs?

- **Enhanced Accessibility Infrastructure:** India must adopt a comprehensive and uniform approach to building accessible infrastructure across urban and rural areas, building upon the **UN Convention on the Rights of Persons with Disabilities (CRPD) (2006)**.
 - This includes the **implementation of universal design standards for public transportation, schools, government buildings, and workplaces**.
 - The government must mandate the **construction of ramps, lifts, tactile pathways, and accessible toilets in all public spaces**.
 - Moreover, **regular accessibility audits** should be conducted to ensure compliance with accessibility laws.
- **Inclusive Education Systems:** To ensure that children with disabilities have equal educational opportunities, India must invest in **inclusive education at all levels, from primary to higher education, adhering to the Salamanca Statement**.
 - This entails **not only physical accessibility in schools but also curricular adaptations, teacher training, and support services**.
 - A national policy should be **established to provide financial incentives to schools for integrating assistive technologies and specialized learning methods**.
- **Private Sector Engagement for Disability Inclusion:** India should establish stronger mandates for the private sector to hire PwDs, along with **clear incentives for companies that achieve disability-inclusive hiring practices**.
 - This can be achieved by incentivizing businesses **through tax breaks, subsidies, and recognition programs** for creating inclusive workplaces.
 - Additionally, employees who acquire disabilities during service must not be terminated and should be offered alternative employment, as mandated by Section 47 of the PwD Act and upheld by the **Supreme Court in *Bhagwan Dass v. Punjab State Electricity Board (2003)***.
- **Vocational Training and Skill Development:** India must expand its vocational training programs to equip PwDs with the technical skills required in various industries, especially in the rapidly growing digital economy.
 - These programs should be **customized to cater to the diverse types of disabilities and should include online courses, apprenticeship programs, and mentorship opportunities**.
 - **Public-private partnerships** could be instrumental in designing inclusive vocational programs, ensuring that they are accessible, relevant, and geared toward both urban and rural PwDs.
- **Strengthening Legal and Policy Frameworks:** While India has made strides with the RPwD Act, **there is an urgent need for more robust enforcement mechanisms** to ensure that policies are effectively implemented at the ground level.
 - This includes creating a **dedicated disability commission** with the authority to **oversee the implementation of disability laws**, conduct investigations, and impose penalties for non-compliance.
 - Additionally, **government agencies must regularly update data on PwDs**, ensuring that policies are based on real-time, comprehensive information.
- **Support for PwD Entrepreneurs:** To foster economic independence and self-reliance, India should **establish dedicated entrepreneurship support programs for PwDs**.
 - These programs can include access to **low-interest loans, business development workshops**, and mentorship from successful entrepreneurs with disabilities.
 - Furthermore, **government-backed platforms should be created for marketing products made by PwD entrepreneurs**, ensuring that their businesses gain visibility and recognition.
 - Encouraging **self-help groups (SHGs) for PwD entrepreneurs** would also help in fostering community-driven business ventures.
 - More role models like **Preethi Srinivasan (Former state-level cricketer turned disability rights activist and co-founder of Soulfree)**, should be brought into the spotlight.
 - **Shark Tank India’s "Divyang Special" Episode** was a significant step.
- **Social Awareness and Attitudinal Change Campaigns:** The government should launch a national campaign to change public attitudes towards disability, focusing on promoting the **capabilities of PwDs and combating stereotypes**.
 - Sensitization training should also be integrated into the curricula of schools and universities, with an emphasis on inclusion from a young age.
 - By fostering a **culture of empathy and understanding**, India can break down the stigma and discrimination that PwDs face in everyday life. More movies like **“Taare Zameen Par” and “Srikant”** should be promoted.

- **Improved Healthcare and Rehabilitation Services:** To enhance the overall quality of life for PwDs, India should create a more comprehensive healthcare and rehabilitation infrastructure that includes **access to specialized medical care, physical therapy, and mental health services.**
 - The government should ensure that **rehabilitation services are available at both the primary and tertiary levels of healthcare**, including mobile rehabilitation units for rural areas.
 - Additionally, **health insurance policies should be made inclusive of PwDs**, covering essential assistive devices and treatment costs, allowing for better healthcare access and reduced out-of-pocket expenses.

PRELIM FACTS

1.Operation Kagar

Operation Kagar, a large-scale counterinsurgency campaign, has encircled the last remaining Naxal strongholds in Chhattisgarh-Telangana border regions.

About Operation Kagar:

- **What it is?**
 - Operation Kagar is an **anti-Naxal military campaign** launched in **January 2024** by the Union Government.
 - It integrates **security action, surveillance technology, and development outreach** to dismantle Left-Wing Extremism (LWE).
- **Core zones:** Bastar (Chhattisgarh), Gadchiroli (Maharashtra), West Singhbhum (Jharkhand).
- **Scale & Strategy:**
 - Involves **1 lakh+ personnel** from CRPF, CoBRA, DRG, STF, and state police.
 - Advanced surveillance tools like **drones, AI, and satellite imagery** are being used.
- **Significance:**
 - Reduced Naxal-affected districts from **106 (in 2015) to just 6** in 2025.
 - Aims to restore **state control**, enable **development**, and **protect tribal communities** from Maoist exploitation.
 - Over **287 Naxals neutralized** in 2024 and **150+ in 2025** already.

2.Depot Darpan Portal

The Ministry of Consumer Affairs, Food & Public Distribution will launch the Depot Darpan portal, for real-time monitoring of food storage depots.

About Depot Darpan Portal:

- **What It Is?**
 - **Depot Darpan** is a **digital monitoring portal and mobile app** that enables real-time oversight of food grain depots using **geo-tagged data, IoT, and AI technologies.**
- **Launched By:** Ministry of Consumer Affairs, Food & Public Distribution.
- **Objective:**
 - To **digitize and modernize** India's food storage infrastructure through **scientific warehousing**, enhancing **efficiency, transparency, and food safety.**
- **Key Features:**
 - **Real-Time Monitoring:** Tracks infrastructure, operational efficiency, and financial metrics through IoT sensors and CCTV surveillance.
 - **Geo-Tagged Auditing:** Depot managers upload geo-tagged infrastructure data validated by supervisory officers and third-party audits.
 - **Automated Ratings & Feedback:** Warehouses receive **star ratings** based on infrastructure and operational performance using a composite scoring model.
 - **Smart Tech Integration:** Includes **CO₂ and phosphine gas monitoring, humidity and temperature sensors, and fire hazard detection.**
 - **AI-Based Tools:** Pilots include **bag counting, Face Recognition Systems (FRS), and Automatic Number Plate Recognition (ANPR)** for tracking vehicle and personnel movements.
 - **Wide Coverage:** Covers **2,278 warehouses**, including those of **FCI, CWC**, and state/private agencies.
 - **Mobile App Support:** Enables supervisory officials to conduct **on-the-go performance reviews** and generate **automated reports** for prompt action.
- **Significance:**
 - **Enhances Food Security:** Ensures quality storage for food grains distributed to over **80 crore beneficiaries** under the **National Food Security Act (NFSA).**
 - **Boosts Efficiency:** Reduces wastage, improves turnover, and optimizes storage space and manpower use.
 - **Supports Digital Governance:** Strengthens India's digital public infrastructure in the logistics and supply chain sector.

3.SeaVision Software

The United States has approved a \$131 million defense sale to India, including SeaVision maritime domain awareness software, training, and support.

About Sea Vision Software:

- **What is SeaVision Software?**
 - SeaVision is a **web-based maritime domain awareness (MDA) tool** that aggregates and visualizes vessel tracking data to support security, safety, and environmental missions.

- **Developed by:** Originally developed by the **S. Department of Transportation**, now operated in collaboration with **Hawkeye 360**, a Virginia-based defense analytics company.
- **Purpose:** To **enhance maritime surveillance, coordination, and decision-making** among allied and partner navies in key strategic waterways.
- **Key Features of SeaVision Software:**
 - **Live Tracking:** Integrates multiple sources such as Automatic Identification System, satellite, and radar for real-time vessel monitoring.
 - **User-Friendly Interface:** Web-based platform requiring no installation, accessible globally.
 - **Multi-user Collaboration:** Enables **joint maritime operations and data sharing** among partner nations.
 - **Custom Alerts & Analytics:** Detects suspicious patterns, illegal fishing, smuggling, or unauthorized entries.
 - **Geo-Fencing:** Users can create zones to monitor activities and receive alerts on breaches.
- **Significance for India:**
 - **Enhanced Indo-Pacific Surveillance:** Boosts India's ability to monitor movements in the Indian Ocean, South China Sea, and other critical sea lanes.
 - **Strategic Deterrence:** Strengthens deterrence posture through better maritime intelligence and early warning.
 - **Interoperability with Allies:** Facilitates coordination with US, QUAD, and IOR partner navies for joint maritime exercises and information sharing.
 - **Support to Sagarmala & Blue Economy:** Supports national initiatives like Sagarmala Project and deep-sea monitoring for economic and environmental safety.

4. Satavahana Dynasty

Archaeological Survey of India (ASI) discovered 11 Satavahana-era inscriptions in the Gundaram Forest of Telangana's Peddapalli district.

- Among them, two inscriptions reveal links to the **Chutu dynasty and Satavahana prince Kumāra Hakusiri**, highlighting early Brahmi script and religious-political symbolism.

About Satavahana Dynasty:

- **Founded by:** *Simuka*, post-Mauryan period (mid-1st century BCE).
- **Etymology:** "Satavahana" in Prakrit means "driven by seven" (symbolic of the Sun God's chariot).
- **Core regions:** Andhra Pradesh, Telangana, Maharashtra.
- **Capitals:** Pratissthana (Paithan) and Amaravati.

Key Rulers:

- **Simuka: Founder**, built *Jain and Buddhist temples*.
- **Satakarni I (70–60 BCE):** Conquered *Kalinga*, performed *Ashvamedha*, and took the title.
- **Hala:** Authored *Gatha Saptashati*, a collection of 700 Prakrit love poems.
- **Gautamiputra Satakarni (106–130 CE):**
 - Greatest king; **defeated Shakas and Nahapana**.
 - Described as *Ekabrahmana* and "destroyer of Kshatriya pride".
 - Expanded from *Krishna River to Malwa*.
- **Yajna Sri Satakarni (165–194 CE):** Promoted *trade and maritime navigation*; coins feature **ship motifs**.

Administrative Framework:

- **Senapati as Provincial Governor:** Military chiefs were appointed as governors to control semi-Brahmanised tribal regions, blending civil and military administration.
- **Feudatory System:** The empire had a three-tier system—*Raja* (independent coinage), *Mahabhoja*, and *Senapati*—ensuring localized governance.
- **Tax-free Land Grants:** Satavahanas granted tax-exempt lands to Brahmins and Buddhist monks, promoting religion and education.

Economic Contributions:

- **Agriculture:** The Krishna-Godavari delta was a fertile rice-producing zone, sustaining the empire's agrarian base.
- **Mining & Trade:** Rich in minerals like iron (Warangal) and gold (Kolar), the region thrived through inland and maritime trade routes.
- **Coinage:** They were the first native rulers to issue portrait coins with legends in Prakrit and regional symbols.

Cultural and Religious Legacy:

- **Architecture:** Rock-cut temples like *Karle Chaitya* and stupas at *Amaravati* and *Nagarjunakonda* showcased a blend of art and devotion.
- **Language:** *Prakrit* was the administrative language, inscribed using *Brahmi script*, ensuring wider reach among common people.

ANSWER WRITING

Q. The recent water-sharing conflict between Punjab and Haryana reflects the limitations of cooperative federalism in India. Do you agree? Justify your answer with relevant examples. (15 Marks, 250 Words)

The **water-sharing dispute** between **Punjab and Haryana**, particularly concerning the **Ravi-Beas river waters**, reflects the inherent challenges in India's **cooperative federalism**. While the Constitution mandates cooperation between states, the persistent conflicts in resource-sharing demonstrate the limitations of the cooperative federalism framework.

Limitations of Cooperative Federalism in Water Disputes

- **Failure of the River Water Tribunal System:** The **River Water Dispute Tribunals (RWDTs)**, established to resolve conflicts, often lead to protracted litigation and delayed decisions, as seen in the Punjab-Haryana water dispute.
- **Inadequate Conflict Resolution Mechanisms:** There is no robust, **mechanical framework** to address water-sharing disputes at the **state level**, resulting in frequent breakdowns of cooperation.
For example: The **Punjab Water Act (2004)** led to Punjab's refusal to implement the **SYL Canal** construction, worsening the dispute and delaying resolution.
- **Unequal Development and Resource Distribution:** Regional resource imbalances often lead to water-sharing conflicts, with states like Punjab viewing water as a state-specific resource due to agricultural reliance.
For example: Haryana, with a significantly smaller share of water resources, argues that the **Punjab government** is not complying with the terms of the 1981 **agreement** on water-sharing.
- **Impact of Federalism's Top-Down Approach:** Centralized decision-making in federalism often hinders states from resolving regional disputes independently, with central intervention complicating cooperation.
For example: The **Inter-State River Water Disputes Act (1956)** and the subsequent creation of tribunals fail to address the underlying political dynamics, leading to **inconsistent decisions** on resource-sharing.

Examples of Cooperative Federalism in Other Contexts

- **Sharing of Electricity Resources Between States:** Cooperative federalism works well in sectors like **electricity** and **telecommunication**, where states have more defined roles and better collaborative frameworks.
- **GST and Tax Reforms: Goods and Services Tax (GST)** is a positive example of **cooperative federalism**. It brought together states with varied interests under a single framework for the benefit of all.
For example: The **GST Council**, comprising both central and state finance ministers, has successfully implemented **uniform tax rates** despite differing political interests.
- **National River Linking Project (NRLP):** The **NRLP** aims to resolve inter-state water disputes through collaboration, though it faces challenges. It seeks to link rivers in a way that benefits states facing water shortages.
For example: The interlinking of the **Ken-Betwa rivers** promises to provide water to drought-prone regions of **Bundelkhand** through interstate cooperation.
- **India's National Health Mission (NHM):** The **NHM** fosters **cooperation between the centre and states** for equitable healthcare delivery, even in resource-poor regions.
- **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA):** **MGNREGA** demonstrates the success of cooperative federalism by ensuring rural development through decentralized decision-making.
For example: The **MGNREGA scheme** has empowered local governments in rural India to create jobs while receiving funds and guidance from the central government.

Measures to Strengthen Cooperative Federalism in Water Sharing

- **Establish Clear and Enforceable Agreements:** To avoid prolonged disputes, legal frameworks should be developed that **clearly define the terms** of resource-sharing and incorporate **strong enforcement mechanisms**.
For example: A more structured version of the **SYL Canal agreement** with enforceable terms can help resolve the Punjab-Haryana issue.
- **Regular Inter-State Dialogue Mechanisms:** Regular **bilateral dialogues** and joint forums should be held to address water-sharing issues, with both political and technical experts involved.
For example: The **Mekong River Commission** has successfully managed water-sharing disputes between Cambodia, Laos, Thailand, and Vietnam through regular, mediated discussions.
- **Implement a National Water Policy with Flexibility:** India needs a **comprehensive national water policy** that can adapt to regional needs while respecting the autonomy of states.
For example: A **revised national water policy** could help resolve the conflicts over water-sharing in Punjab, Haryana, and neighboring states.
- **Strengthen the Role of River Basin Organisations:** **River Basin Organizations (RBOs)** can coordinate water distribution and management across states within a river basin, ensuring a more unified approach to water-sharing.
For example: The **Godavari River Basin Authority** could play a greater role in managing resources in the Godavari basin, which covers multiple states.
- **Enhanced Role of Technology in Monitoring:** The use of **data and technology** for **real-time monitoring** of water levels and flows can help reduce disputes by providing an accurate, neutral basis for decision-making.
For example: The **India-Water Portal** could be upgraded to offer real-time monitoring of river water usage and distribution to ensure transparency in water-sharing agreements.

While the water-sharing dispute between Punjab and Haryana highlights the limitations of cooperative federalism in India, it also underscores the need for **structural reforms** in resource management. A **balanced approach** involving legal clarity, regular dialogue, and technological intervention will help foster a more **cooperative federal system** that can address such issues without escalating tensions.

MCQ

1. Consider the following statements regarding Operation Kagar:
 1. Operation Kagar was launched in January 2024 as an anti-Naxal campaign.
 2. The operation is limited to the states of Chhattisgarh and Telangana only.
 3. It uses drones, artificial intelligence, and satellite imagery for surveillance.
 Which of the statements given above is/are correct?
 (a) 1 and 2 only (b) 2 and 3 only
 (c) **1 and 3 only** (d) 1, 2 and 3

2. Consider the following statements regarding the Depot Darpan Portal:
 1. It enables real-time monitoring of food grain depots using geo-tagged data and AI technologies.
 2. The portal has been launched by the Ministry of Agriculture and Farmers Welfare.
 3. Depot managers are required to upload infrastructure data, which is validated by third-party audits.
 Which of the statements given above is/are correct?
 (a) 1 and 2 only (b) 2 and 3 only
 (c) **1 and 3 only** (d) 1, 2 and 3

3. Consider the following statements regarding the SeaVision maritime domain awareness software:
 1. SeaVision is a web-based tool that aggregates vessel tracking data from sources like satellites and radar.
 2. It requires installation and is restricted to use within US naval operations only.
 3. The software supports missions related to maritime security, safety, and environmental protection.
 Which of the statements given above is/are correct?
 (a) 1 and 2 only (b) **1 and 3 only**
 (c) 2 and 3 only (d) 1, 2 and 3

4. Consider the following statements regarding the Satavahana dynasty:
 1. The Satavahanas were the first native Indian rulers to issue portrait coins with Prakrit legends.
 2. Gautamiputra Satakarni is known for defeating the Shakas and Nahapana, and for expanding the empire up to Malwa.
 3. The dynasty exclusively used Sanskrit as the administrative language in all inscriptions.
 Which of the statements given above is/are correct?
 (a) **1 and 2 only** (b) 2 and 3 only
 (c) 1 and 3 only (d) 1, 2 and 3

5. Consider the following statements regarding Automatic Number Plate Recognition (ANPR).

Statement-I: ANPR systems help improve road tax compliance and traffic law enforcement.

Statement-II: They rely on blockchain-based registries for immutable vehicle identification.

 Select the correct answer code:
 (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
 (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
 (c) **Statement-I is correct but Statement-II is incorrect**
 (d) Statement-I is incorrect but Statement-II is correct

6. Consider the following statements regarding Global Navigation Satellite System (GNSS) integration in tolling:
 1. GNSS cannot be used in tunnels or under dense foliage.
 2. GNSS tolling allows real-time feedback on road conditions to drivers.
 3. GNSS allows seamless interoperability across countries using different satellite systems.
 How many of the above statements is/are correct?
 (a) **Only one** (b) Only two
 (c) All three (d) None

7. Consider the following statements regarding Khadi and Village Industries Commission (KVIC):
 1. KVIC was originally established as part of the Planning Commission.
 2. KVIC supplies raw materials and offers artisan training.
 3. It undertakes R&D to promote renewable energy use in rural industries.
 4. KVIC has the authority to conduct market linkage campaigns and retail promotions.
 How many of the above statements is/are correct?
 (a) Only one (b) Only two
 (c) **Only three** (d) All four

8. Consider the following statements regarding the objectives and design of the HEALD initiative, recently in news:
 1. It promotes liver transplant surgeries under a subsidized scheme.
 2. It aims to integrate liver health into national health policies.
 3. Community outreach under HEALD focuses on underprivileged populations.
 How many of the above statements is/are correct?
 (a) Only one (b) **Only two**
 (c) All three (d) None

9. Consider the following statements about Moonlight Solar Panels Technology:

Statement-I: Moonlight Solar Panels generate electricity using heat lost from their surfaces at night.

Statement-II: It works based on thermoelectric generators capturing radiative cooling differentials.

 Which one of the following is correct in respect of the above statements?
 (a) **Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I**
 (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
 (c) Statement-I is correct but Statement-II is incorrect
 (d) Statement-I is incorrect but Statement-II is correct

10. Long-term exposure to PM10 pollution is primarily associated with which of the following health issues?
 1. Exacerbation of asthma and bronchitis.
 2. Increased risk of cardiovascular diseases.
 3. Impaired lung growth in children.
 4. Development of skin allergies.
 Which of the statements given above is/are correct?
 (a) 1 and 4 only (b) 2 and 3 only
 (c) **1, 2, and 3 only** (d) 1, 2, 3, and 4