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FORTUNE WEEKLY DIGEST

› ETHANOL AND COAL GASIFICATION › QUAD › INDIAN FEDERALISM

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FORTUNE WEEKLY DIGEST

EDITOR'S NOTE

As UPSC aspirants, it is essential to stay updated on current affairs to excel in the examination. This **Fortune Weekly Digest (ForWarD)** brings you the latest news and developments from around the world, carefully curated and analyzed to help you prepare for the Civil Services (Main) Examination.

We understand that time is precious, and we have made sure to present the information in a concise and easy-to-understand manner.

The magazine is divided into different sections. Mains relevant topics have been covered in detail with a UPSC previous year question perspective. The jot downs are examples and interesting facts to enrich your answer writing. Cherrypicks has some key words from the week, helpful again in answer writing and essay. We have also included essay topics and sample questions to help you guage your preparation.

We have designed this magazine to best supplement the daily current affairs notes we have launched by the name of **FIND (Fortune IAS News Daily)** and **FINDER (Fortune IAS News Daily Explainer)** and the **Fortune Prelims Precise** monthly compilation. This magazine will be explained in detail and your queries addressed in a live class we conduct.

At a time when there is no dearth of current affairs materials, our hope is help you get a one-stop solution for all your current affairs needs.

This magazine is a work in progress and your feedback will be appreciated.

We hope that this magazine will serve as a valuable resource for your exam preparation and contribute to your success in the UPSC examination.

INDEX

100% ETHANOL AND COAL GASIFICATION: REAL SOLUTIONS FOR INDIA'S ENERGY SECURITY?

Syllabus: GS III - Renewable Energy

PYQ MAPPING

Q) *"Discuss several ways in which microorganisms can help in meeting the current fuel shortage."* ***(2023)***

WHY IN NEWS

India is aggressively promoting **100% ethanol fuel vehicles** and **coal gasification projects** as part of its strategy to reduce import dependence, enhance energy security, and achieve sustainable economic growth. Recently, the Union Cabinet approved a ₹37,500 crore incentive scheme to accelerate coal gasification projects targeting 75 million tonnes of coal gasification by 2030.

INTRODUCTION

India imports a significant share of its crude oil, LNG, methanol, ammonia, and fertilizers, making the economy vulnerable to global price shocks and geopolitical disruptions. In this context, ethanol-based fuels and coal gasification are being projected as alternatives to conventional fossil fuels. However, questions remain regarding their environmental sustainability, economic viability, and long-term role in India's energy transition.

WHAT IS ETHANOL FUEL?

Ethanol is a biofuel produced mainly from sugarcane, maize, damaged food grains, and agricultural residues.

Key Features

- Renewable and domestically produced fuel.
- Lower carbon emissions compared to petrol.
- Supports farmers through increased demand for agricultural produce.
- Can be used in flex-fuel vehicles.

SIGNIFICANCE OF 100% ETHANOL

Enhances Energy Security:

- 100% ethanol reduces India's dependence on imported crude oil and strengthens energy self-reliance.
- *Example*- India imports nearly **85% of its crude oil requirements**, making ethanol an important alternative fuel source.

Supports Farmers' Income:

- Ethanol production creates an additional market for crops such as sugarcane and maize, thereby increasing farmers' earnings.
- *Example*- Sugar mills can divert surplus sugar to ethanol production, ensuring timely payments to farmers.

Environmental Benefits:

- Ethanol is a cleaner-burning fuel compared to petrol and emits fewer greenhouse gases and pollutants.
- *Example*- Ethanol blending can significantly lower carbon monoxide and particulate emissions from vehicles.

Generates Rural Employment:

- Establishment of ethanol distilleries and related infrastructure creates direct and indirect employment opportunities in rural areas.
- *Example*- New ethanol plants in sugar-producing states like Uttar Pradesh and Maharashtra have generated local jobs.

CHALLENGES OF 100% ETHANOL

Water-Intensive Crop Production:

- Large-scale ethanol production depends heavily on sugarcane, a highly water-intensive crop.
- Excessive cultivation may aggravate water scarcity in drought-prone regions.
- *Example*- Sugarcane occupies only about **3% of India's agricultural land** but consumes a disproportionately large share of irrigation water.

Food vs Fuel Debate:

- Diverting food grains such as maize and rice towards fuel production may affect food availability and prices.
- *Example*- Increased maize demand for ethanol can raise feed costs for the poultry industry.

Vehicle Compatibility Issues:

- Most existing vehicles are not designed to run on pure ethanol (E100) and require engine modifications.
- *Example-* Brazil's success with E100 relies on widespread use of flex-fuel vehicles.

Land Use Concerns:

- Rising biofuel demand may encourage monoculture farming, reducing biodiversity and soil health.
- *Example-* Expansion of sugarcane cultivation may replace diverse cropping systems.

WHAT IS COAL GASIFICATION?

- Coal gasification is a process that converts coal into **syngas (synthetic gas)** containing carbon monoxide, hydrogen, methane, and carbon dioxide through partial oxidation at high temperatures.
- Syngas can be used to manufacture chemicals, fertilizers, fuels, and hydrogen.

SIGNIFICANCE OF COAL GASIFICATION

Reduces Import Dependence:

- Coal gasification can produce several industrial products domestically, reducing imports and improving strategic autonomy.
- *Example-* It can be used to manufacture **methanol, ammonia, urea, synthetic natural gas (SNG), and hydrogen**, products for which India currently spends substantial foreign exchange.

Utilises Domestic Coal Resources:

- India possesses abundant coal reserves, which can be utilized more efficiently through gasification technologies.
- *Example-* India has over **400 billion tonnes of coal reserves**, making coal gasification a potential resource-security strategy.

Promotes Industrial Development:

- Coal gasification supports downstream industries such as fertilizers, petrochemicals, steel, and energy production.
- *Example-* Gasified coal can provide feedstock for fertilizer plants and methanol-based industries.

Generates Employment:

- New gasification projects can create employment opportunities in mining and industrial regions.
- *Example-* Coal-bearing states such as Jharkhand, Odisha, and Chhattisgarh can benefit from industrial expansion.

CHALLENGES OF COAL GASIFICATION

High Carbon Footprint:

- Although cleaner than direct coal combustion, gasification still generates substantial carbon emissions.
- *Example-* Large quantities of CO_2 are released during syngas production unless carbon capture technologies are employed.

Technology Constraints:

- Indian coal contains high ash content, which creates technical challenges for efficient gasification.
- *Example-* Many imported gasification technologies are optimized for low-ash coal and require adaptation for Indian conditions.

Economic Viability Issues:

- Coal gasification projects require significant capital investment and infrastructure.
- *Example-* Their competitiveness often depends on global oil, gas, and fertilizer prices.

Environmental Concerns:

- Gasification consumes considerable water and generates waste products that require proper management.
- *Example-* Poorly managed projects may contribute to local water pollution and environmental degradation.

ARE 100% ETHANOL AND COAL GASIFICATION REAL SOLUTIONS?

Arguments in Favour

- **Pragmatic Energy Transition:** Both technologies can serve as transitional solutions while renewable energy capacity continues to expand.
  - *Example-* Ethanol can immediately reduce petrol consumption, while coal gasification can substitute imported natural gas and chemicals.
- **Reduced Import Dependence:** They improve India's energy security and reduce vulnerability to global supply disruptions.
  - *Example-* Domestic ethanol and gasification-based fertilizers reduce dependence on imported crude oil and ammonia.
- **Supports Atmanirbhar Bharat:** They promote domestic manufacturing, industrial growth, and value addition using local resources.
  - *Example-* Indigenous production of methanol and ethanol supports self-reliance goals.

Arguments Against

- **Not Completely Green:** Ethanol production can create ecological stress, while coal gasification remains dependent on fossil fuels.
  - *Example-* Intensive sugarcane cultivation depletes groundwater, while gasification still emits greenhouse gases.
- **Limited Long-Term Sustainability:** These technologies alone may not fully align with India's Net-Zero 2070 target.
  - *Example-* Coal gasification requires Carbon Capture, Utilisation and Storage (CCUS) to significantly reduce emissions.
- **Resource Constraints:** Large-scale expansion may face limitations related to water availability, land use, and environmental sustainability.
  - *Example-* Water-stressed states may struggle to support further sugarcane expansion.

WAY FORWARD

- **Diversify Ethanol Feedstock**: Promote second-generation (2G) ethanol produced from agricultural residues and biomass rather than food crops.
  - *Example:* Converting rice straw and sugarcane bagasse into ethanol can reduce stubble burning and create additional income for farmers.
- **Integrate CCUS with Coal Gasification:** Carbon Capture, Utilisation and Storage should be incorporated to reduce emissions.
  - *Example:* Captured CO_2 can be used in chemical industries or stored underground.
- **Promote Green Hydrogen:** Gradually shift towards hydrogen produced using renewable energy sources.
  - *Example:* The National Green Hydrogen Mission aims to make India a global hub for green hydrogen production.
- **Strengthen Circular Economy Approaches**: Utilize agricultural waste and industrial by-products efficiently.
  - *Example:* Crop residues that are usually burned can be converted into biofuels.
- **Adopt a Balanced Energy Mix:** Combine renewables, biofuels, green hydrogen, nuclear energy, and cleaner fossil-fuel technologies for long-term energy security.
  - *Example:* A diversified energy portfolio reduces both import dependence and environmental risks.

CONCLUSION

100% ethanol and coal gasification are not perfect solutions, but they can serve as important transitional tools in India's energy journey. Their success will depend on sustainable feedstock management, technological innovation, carbon mitigation measures, and integration with renewable energy to ensure energy security without compromising environmental sustainability.

SAMPLE QUESTION

Q) Coal gasification and ethanol blending are often described as 'bridging technologies' in India's transition towards a low-carbon economy. Critically examine. **(15 marks) (250 words)**

INDIA'S EVOLVING METROLOGY SYSTEM

Syllabus: GS III - Changes in industrial policy and their effects on industrial growth.

PYQ MAPPING

Q) *"Investment in infrastructure is essential for more rapid and inclusive economic growth." Discuss in the light of India's experience.* ***(2021)***

WHY IN NEWS

A recent **PIB explainer article titled "India's Evolving Metrology Ecosystem-Strengthening Trade, Transparency, and Consumer Protection"** has highlighted the growing importance of measurement science in ensuring fair trade and governance.

INTRODUCTION

Metrology, the science of measurement, ensures **accuracy and uniformity in trade and industry**. Today, India's system is governed by the Legal Metrology Act, 2009 and anchored by the National Physical Laboratory, aligning domestic standards with global practices.

HISTORICAL EVOLUTION

Ancient Measurement Traditions:

- Ancient India developed a **well-structured system of weights and measures** used in trade, taxation, agriculture, jewellery-making, and daily transactions.
- Standard units such as **Rati, Masha, Tola, Seer, Maund, and Candy** were widely used, often derived from **seeds, grains, and natural objects**.

Indus Valley and Early State Systems:

- The Indus Valley Civilization had **highly standardized weights and measures**, indicating advanced urban planning, trade networks, and architectural precision.
- During the Mauryan Empire (322–185 BCE), **state-regulated measurement systems** ensured uniform taxation, trade regulation, and administrative efficiency.

Medieval Standardization:

- Sher Shah Suri standardized weights and measures and introduced the **Rupiya coin**, laying the foundation for India's modern monetary system.

Post-Independence Scientific Metrology:

- Establishment of the **National Physical Laboratory (1947)** marked the beginning of India's modern scientific metrology system.
- India adopted the **International System of Units (SI) during 1957–58**, aligning with global measurement standards.

INSTITUTIONAL FRAMEWORK

National Physical Laboratory (NPL) as Apex Institution:

- NPL functions as India's **National Measurement Institute**, maintaining **national prototypes of the metre and kilogram**
- It ensures **traceability, calibration, and accuracy** across scientific, industrial, and commercial applications.
- **Key Achievements of NPL**
  - Founding member of the **Asia Pacific Metrology Program (APMP)**, enhancing regional cooperation.
  - Developed **indelible ink used in elections across 37 countries**, symbolizing India's global technological contribution.
  - Established **India's first certification facility for environmental monitoring equipment**.
  - Developed a **world-class solar cell calibration facility** supporting renewable energy goals.
  - Innovated **carbon composite materials** for strategic and defence sectors.

Regional Reference Standard Laboratories (RRSLs):

- RRSLs verify and compare measurement standards used in **laboratories and commercial trade**, ensuring uniform implementation across states.

Indian Institute of Legal Metrology (IILM):

- Located in Ranchi, IILM provides **training for Legal Metrology Officers**, strengthening enforcement and administrative capacity.

International Institutional Linkages:

- India is a member of the **International Bureau of Weights and Measures (BIPM)** and the **International Organization of Legal Metrology (OIML)**, participating in global standard-setting.

LEGAL FRAMEWORK

- **Standards of Weights and Measures Act, 1956:**
  - Established a **uniform, scientific, metric-based system** of measurement across India.
  - Facilitated alignment with **SI Units and international metrology practices**.
- **Standards of Weights and Measures Act, 1976:**
  - **Introduced**
    - **Standardized numeration system**
    - Regulation of **inter-state trade and commerce**
    - Approval and standardization of measuring instruments
    - Establishment of **IILM for training**
    - **Penalties and punishments** for violations
- **Legal Metrology Act, 2009 (Implemented in 2011):**
  - Replaced earlier laws (1976 & 1985 Acts) to create a **modern legal framework**.
  - Ensures **accuracy, transparency, and consumer protection** in trade.
  - Key Provisions
    - Mandatory adoption of **metric system across India**
    - **Verification and stamping** of weighing instruments before use
    - Regulation of **manufacturers, dealers, importers, and repairers**
    - Mandatory declarations on **pre-packaged commodities (MRP, quantity, manufacturer details)**
    - Powers to Legal Metrology Officers for **inspection, search, seizure, and enforcement**
    - Penalties for **non-standard or unverified instruments**
- **Jan Vishwas Reforms (2023 & 2026):**
  - **Decriminalization of 7 provisions** by replacing imprisonment with monetary penalties (2023).
  - Introduction of **"improvement notice" mechanism** (2026) allowing MSMEs to rectify first-time violations.
  - Promotes **ease of doing business, trust-based governance, and voluntary compliance**.

SIGNIFICANCE

- **Foundation of Economic Systems:** Measurement underpins **trade, industrial production, scientific research, and governance systems**.
- **Ensuring Fair Trade and Consumer Protection:** Prevents **short delivery, inaccurate billing, and unfair practices**, ensuring value for money.
- **Role in Everyday Life:** Regulates instruments used in **petrol pumps, grocery stores, jewellery shops, hospitals, electricity and water systems**.
- **Public Safety and Welfare:** Ensures **accurate medical diagnostics, reliable utility billing, and road safety enforcement (speed measurement)**.
- **Industrial and Technological Development:** Supports **precision manufacturing, semiconductor industry, product development, and quality assurance**.
- **Digital Economy and Advanced Sectors:** Enables **accurate time synchronization** for telecommunications, digital payments, AI, IoT, and internet services.
- **Policy Making**: Theme of **World Metrology Day (20 May)**: "Metrology: Building Trust in Policy Making" highlights its role in **evidence-based governance**.

LATEST DEVELOPMENTS

- **eMaap Portal:**
  - Digital platform for **online registration and nationwide integration** of Legal Metrology service and enhances **Ease of Doing Business and transparency** in G2B services.
- **'One Nation, One Time' Initiative:**
  - Ensures **Indian Standard Time (IST) dissemination with millisecond-to-microsecond accuracy**.
  - Implemented with **NPL and ISRO through 5 labs**.
  - Reduces dependence on **foreign systems like GPS** and strengthens national security.
- **Expansion of Global Access to Competitiveness through Technology Centres (GATCs) (2025):**
  - Scope expanded to **18 categories of measuring instruments**, increasing verification capacity.
- **OIML Certification Recognition (2023):**
  - India became the **13th country authorized to issue globally accepted certificates**.
  - Enables exports without additional testing and generates **foreign exchange earnings**.
- **Consumer-Centric Reforms:**
  - Mandatory **country-of-origin disclosure for e-commerce (effective 1 July 2027)** which strengthens **transparency and informed consumer choice**.

CHALLENGES

- **Implementation Gaps:** Weak enforcement in **informal and rural markets** leads to continued violations.
- **Infrastructure Limitations:** Inadequate **advanced laboratories, calibration facilities, and testing centres**.
- **Technological Challenges:** Rapid evolution of **AI, IoT, digital systems, and semiconductors** demands high-precision metrology capabilities.
- **Compliance Burden for MSMEs:** Procedural complexity and cost affect **small businesses' compliance levels**.
- **Low Consumer Awareness:** Limited awareness reduces **complaints and accountability mechanisms**.

WAY FORWARD

- **Strengthening Enforcement:** Enhance **coordination between Centre and States** and improve inspection mechanisms.
- **Modernizing Infrastructure:** Invest in **advanced metrology labs, digital calibration systems, and quantum metrology research**.
- **Capacity Building:** Expand training through **IILM and technical institutions** to create skilled manpower.
- **Promoting Digital Governance:** Scale up platforms like **eMaap** for seamless, transparent compliance.
- **Enhancing Consumer Awareness:** Conduct **nationwide awareness campaigns** on measurement rights.
- **Leveraging Emerging Technologies:** Integrate **AI, IoT, blockchain, and high-precision time systems** for future-ready metrology.

CONCLUSION

India's metrology framework plays a key role in ensuring fair trade, consumer protection, and industrial quality in a rapidly digitalizing economy. Strengthening precision infrastructure, enforcement, and emerging technologies will be crucial for enhancing global competitiveness and trust in measurement systems.

SAMPLE QUESTION

Q) Examine the significance of legal metrology in promoting transparency and accountability in markets. **(10 marks) (150 words)**

INDIAN FEDERALISM: CHALLENGES AND SOLUTION

Syllabus: GS II - Issues and challenges pertaining to the federal structure

PYQ MAPPING

Q) *Examine the evolving pattern of Centre-State financial relations in the context of planned development in India. How far have the recent reforms impacted the fiscal federalism in India?* ***(2025)***

Q) *What changes has the Union Government recently introduced in the domain of Centre-State relations? Suggest measures to be adopted to build the trust between the Centre and the States and for strengthening federalism.* ***(2024)***

Q) *How far do you think cooperation, competition and confrontation have shaped the nature of federation in India? Cite some recent examples to validate your answer.* ***(2020)***

WHY IN NEWS

A recent article in The Indian Express by Devesh Kapur, a political scientist at Johns Hopkins SAIS, and Arvind Subramanian, former Chief Economic Advisor to the Government of India (2014–18), has reignited debate on the **challenges of Indian federalism**.

INTRODUCTION

Indian federalism is best understood as a **"work in progress"**, constantly evolving in response to shifting political, demographic, and economic realities. It reflects a **delicate balance between representation and redistribution**, making Centre–State relations inherently dynamic and contested.

SHORT TAKES

- **Sarkaria Commission (1983)**
  - Chaired by Justice R.S. Sarkaria, was set up to review Centre–State relations and submitted its **1988 report with 247 recommendations** to strengthen cooperative federalism.
  - It recommended measures like **limited use of Article 356, creation of an Inter-State Council, and greater state autonomy**, while retaining a strong Centre.

HISTORICAL EVOLUTION

- **Colonial Legacy of Centralisation:** British rule, especially under the **Government of India Act, 1935**, introduced a federal structure but **retained overriding central control**, shaping India's later centralised federalism.
- **Partition and Need for Strong Centre:** The instability and communal tensions after Partition led the Constituent Assembly to adopt a **"holding together federation"** with a strong Union.
- **Integration of Princely States:** The political unification led by Sardar Patel required strong central authority, reinforcing a unitary bias in the federal structure.
- **Post-Independence Central Dominance (1950–1967):** One-party dominance and frequent use of Article 356 enabled a cooperative yet highly centralised federal system.
- **Phase of Federal Assertion (Post-1967):** The rise of regional parties and recommendations of the **Sarkaria Commission** strengthened demands for greater state autonomy.
- **Economic Liberalisation Phase (1991 onwards):** Market reforms and decentralisation increased the developmental role of states and fostered inter-state competition.
- **Contemporary Phase:** A **mix of cooperative and competitive federalism** has emerged with institutions like **NITI Aayog** promoting Centre-State collaboration.

FEDERALISM IN CONSTITUTION

- **Quasi-Federal Structure:** India is described as a **"Union of States" with unitary bias**, combining federal and unitary features.
- **Division of Powers (Seventh Schedule):** Union List (strong Centre), State List (state autonomy), Concurrent List (shared powers).
- **Strong Centre Features:**
  - Unlike classic federations, India has a single Constitution and single citizenship.
  - Residuary powers with Centre
  - Emergency provisions (Articles 352, 356, 360)
  - All-India Services (IAS, IPS)
- **Independent Judiciary:** Supreme Court acts as arbiter of Centre-State disputes, ensuring constitutional balance.
- **Financial Federalism:**
  - The Finance Commission distributes revenues between Centre and States.
  - GST introduced a shared fiscal framework through GST Council.
- **Flexibility with Unitary Tilt:** Parliament can alter state boundaries (Article 3), showing flexibility.

COOPERATIVE VS COMPETITIVE FEDERALISM

Basis	Cooperative Federalism	Competitive Federalism
Meaning	Centre and States work together to solve common problems through collaboration	States compete with each other (and sometimes Centre) to attract investment and improve governance
Nature of Relations	Collaborative (vertical + horizontal cooperation)	Competitive (mainly horizontal state–state competition)
Objective	Achieve balanced development and national unity through coordination.	Enhance efficiency, innovation, and resource utilisation through competition.
Institutional Mechanisms	NITI Aayog, GST Council, Finance Commission promote joint decision-making	NITI Aayog rankings, performance-based indices, investment summits promote competition.
Outcome/Impact	Policy coherence, reduced conflict, inclusive growth	Better governance, innovation, but risk of regional disparities

CHALLENGES

- **Centralisation of Power:** The Constitution provides strong powers to the Centre like residuary powers, emergency provisions.
  - **Example** The arbitrary dismissal of the S.R. Bommai government in Karnataka (1989) under Article 356 (President's Rule).
- **Rising democratic deficit:** Lower fertility in the South and higher population growth in the Hindi heartland have intensified regional imbalances in representation.
  - **Data Point**- The **freeze on delimitation** based on the 1971 Census has created **unequal representation**, with Southern states projected to lose 23 seats and Northern states gain 31 seats based on current population trends.
- **Role of Governor:** Centrally appointed Governors often act controversially in state politics.
  - **Example**- In 2023, the **Tamil Nadu** government approached the Supreme Court because Governor R.N. Ravi withheld assent on 10 crucial bills.
- **Regionalism**: Strong regional identities sometimes challenge national integration, leading to demands for autonomy or special status.
  - **Example** The **2023–2024 protests in Ladakh** demanding statehood and inclusion under the **Sixth Schedule** of the Constitution.
- **Inter-State Disputes:** Conflicts between states over resources and boundaries weaken cooperative federalism.
  - **Example** The **Satluj-Yamuna Link (SYL) Canal dispute** between Punjab and Haryana over the sharing of Ravi-Beas river waters.
- **Language and Cultural Conflicts:** Linguistic diversity creates tensions when one language is perceived as imposed.

- **Example-** Pressure from southern states led the MHA to conduct CAPF constable exams in 13 regional languages instead of only Hindi and English.

- **Growing fiscal imbalance:** Fiscal transfers have become increasingly unequal, with the **Hindi heartland receiving about 90% more** than its economic contribution, while the **South and West receive 44% and 58% less respectively.**

- **Overlap in Concurrent List:** Subjects like education, forests, and agriculture create jurisdictional conflicts.
  - **Example-** Friction over the **National Education Policy (NEP) 2020** and **NEET examinations**.

WAY FORWARD

- **Reviving democratic sensibility:** Federalism must be guided by consultation, accommodation, and restraint, especially by the Centre.
- **Balancing fiscal federalism:** Redistribution should ensure equity without disincentivising high-performing states.
- **Addressing representation issues:** Future delimitation must balance population-based representation with political stability.
- **Reducing regional disparities:** Policies should focus on inclusive growth to bridge economic and demographic gaps.
- **Rebuilding trust:** Strengthening trust between the Centre and states is essential for cooperative federalism to function effectively.

CONCLUSION

The emerging tensions in Indian federalism are rooted in **divergent state performance and an erosion of democratic sensibility**, rather than merely institutional design flaws. Sustaining the federal compact will require **reconciling equity with efficiency while restoring trust through genuine cooperative federalism**.

SAMPLE QUESTION

Q) Discuss the changing nature of Centre–State relations in India in the era of cooperative and competitive federalism **(10 marks) (150 words)**

QUAD: ANALYSIS

Syllabus: GS II - International Relations

PYQ MAPPING

Q) *Quadrilateral Security Dialogue (Quad) is transforming itself into a trade bloc from a military alliance, in present times. Discuss.* ***(2020)***

WHY IN NEWS

At the **11th Quad Foreign Ministers' Meeting**, the **Quadrilateral Security Dialogue** launched initiatives on **energy security and maritime domain awareness for humanitarian operations at sea**.

INTRODUCTION

The **Quadrilateral Security Dialogue (QUAD)** is an **informal strategic partnership** between **India, the United States, Japan, and Australia** aimed at promoting a **free, open, and rules-based Indo-Pacific**. It has emerged as a **key platform** to address evolving **geopolitical, economic, and security challenges** in the region.

SHORT TAKES

- **Sea Lanes of Communication (SLOCs)**: **Strategic maritime routes that carry over 80% of global trade by volume and most of the world's oil and gas shipments**, making them vital for economic and energy security.

ABOUT QUAD

- **Members**: India, the United States, Japan, and Australia
- **Origin:**
  - Began as a **humanitarian partnership after the 2004 Indian Ocean tsunami** and was **formalised in 2007 by Japanese Prime Minister Shinzo Abe** as a strategic dialogue among the four countries
  - It was **revived in 2017** as a more structured Indo-Pacific framework.
- **Focus Areas:** Maritime security, Economic resilience, Technology cooperation, Disaster relief
- **Guiding Principle:** Free, open, inclusive, and resilient Indo-Pacific
- **China factor in Quad discourse:** China has remained a constant reference point, initially in generic terms like opposing coercion, later shifting to specific concerns such as **militarisation of disputed islands, maritime militia, and aggressive coast guard actions.**

11TH QUAD FOREIGN MINISTERS MEETING 2026

- **Event:** 11th Quad Foreign Ministers' Meeting held in **New Delhi (May 26, 2026)**.
- **Participants:** External Affairs Ministers of all four member states.
- **Major Outcomes:**
  - **Indo-Pacific Maritime Surveillance Collaboration (IPMSC):** First-of-its-kind initiative to enhance shared maritime domain awareness, initially focusing on the Indian Ocean Region to counter coercion.
  - **Quad Critical Minerals Initiative**: To mobilise up to **$20 billion** (public + private) for secure, diversified, non-coercive supply chains across mining, processing, and recycling.
  - **Quad Partnership for Cable Connectivity and Resilience**: To expand secure undersea telecom cables across the Indo-Pacific.
  - **NextGen Agriculture & Health:** Over **$6 million** for **AI-ENGAGE** (AI & robotics for food security) and **$50 million** for training health professionals for outbreak response.
  - **AI & Food Security:** Under **AI-ENGAGE**, over **USD 6 million** allocated for six projects using AI, robotics, and sensors to improve agriculture and food security.
  - **Counter-Terrorism Cooperation:** Australia will host a **Quad Counterterrorism Tabletop Exercise (2026)** focusing on state-sponsored terrorism and misuse of drones and emerging technologies.
  - **Infrastructure Development:** Planned collaboration with **Fiji on port infrastructure** under the **Quad Ports of the Future Partnership**.
  - **Emerging Tech:** Progress on **Open RAN** (Radio Access Network) **project in Palau**, collaboration on **6G standards**, and a **Digital Identity Standards workshop**.

AREAS OF COOPERATION

- **Maritime Security:**
  - **Indo-Pacific Partnership for Maritime Domain Awareness (IPMDA)** to monitor Exclusive Economic Zones (EEZs) using near-real-time commercial satellite data .
  - First joint Coast Guard observer mission (**QUAD at Sea Mission)** under the Wilmington Declaration to enhance Indo-Pacific maritime security .
  - India hosted the inaugural symposium of the **Maritime Initiative for Training in the Indo-Pacific (MAITRI)** in 2025.
- **Supply Chain Resilience:**
  - The **Quad Clean Energy Supply Chain Diversification Program** aims at reducing dependence on China by diversifying and securing resilient supply chains for clean energy technologies.
- **Climate Change and Disaster Relief:**
  - **Quad Climate Change Adaptation and Mitigation Package (Q-CHAMP) was** launched in 2022 to coordinate the sharing of high-resolution climate data.
- **Health Diplomacy:**
  - The **Quad** delivered **nearly 800 million Covid-19 vaccine doses globally**, 400 **million** of which went to Indo-Pacific **countries**.
- **Education and Skills:**
  - **Quad Fellowship,** launched in 2021, supports 100 outstanding STEM master's and doctoral students annually (25 from each Quad country) to study in the United States.
- **Space cooperation:**
  - Launch of Quad satellite data portal and expansion into space situational awareness (SSA).

SIGNIFICANCE FOR INDIA

- **Strategic Balancing:** Helps counterbalance **China's growing influence** in Indo-Pacific
- **Maritime Security:** Strengthens India's role as a **net security provider in the Indian Ocean**
- **Technological and Economic Gains:** Access to advanced technologies and resilient supply chains
- **Global Positioning:** Enhances India's image as a **key Indo-Pacific power**
- **Strategic Autonomy:** Participation without formal alliance commitments preserves independence

QUAD VS NATO

The Quad is often **labelled by China as an "Asian NATO"** to portray it as an anti-China military bloc, a characterization which the Quad members consistently reject.

Aspect	QUAD	NATO
Nature	Informal grouping	Formal military alliance
Legal Status	No treaty	Treaty-based (1949)
Collective Defence	Not Applicable	Article 5 (collective defence)
Focus	Indo-Pacific cooperation	Euro-Atlantic security

CHALLENGES

- **Lack of institutional structure:** Quad remains informal without binding commitments or strong institutions.
- **US de-prioritisation:** Quad faces reduced emphasis under the second Trump administration, affecting momentum.
- **Overextended agenda:** Too many working groups have diluted focus and reduced effectiveness.
- **Divergent priorities:** Member countries have different regional and strategic priorities, affecting unity.
- **China factor:** Perception of QUAD as an **anti-China coalition** increases geopolitical friction and resistance.
- **Irregular engagement:** Occasional delays or gaps in summits and meetings reduce policy momentum and implementation efficiency.
- **ASEAN sensitivity:** Concerns over undermining **ASEAN centrality** in the Indo-Pacific regional architecture.

WAY FORWARD

- **Institutional strengthening with flexibility:** Gradually deepen institutional mechanisms without converting QUAD into a rigid military alliance.
- **Functional expansion:** Broaden cooperation into **critical technologies, climate action, infrastructure development, energy security, and resilient supply chains**.
- **Balanced strategic approach:** Maintain a **non-militarised but deterrence-capable posture** to ensure regional stability without escalating tensions.
- **Regional integration:** Stronger coordination with ASEAN, IORA, and Pacific Island Forum is needed.
- **Sustained high-level engagement:** Ensure continuity through **regular summits, ministerial meetings, and joint working groups** for effective implementation.

CONCLUSION

QUAD represents a **flexible and evolving mechanism** that balances **strategic cooperation** with respect for **national autonomy** among its members. Its long-term relevance will depend on its ability to **deepen cooperation**, while maintaining **inclusivity** and managing **geopolitical sensitivities**, particularly with China.

SAMPLE QUESTION

Q) The Quad is often labelled as an 'Asian NATO' by China. Critically examine whether this characterisation reflects ground realities in Indo-Pacific geopolitics. **(15 marks) (250 words)**

WEEKLY DOSSIERS

INDIA'S ECONOMIC GROWTH DEPENDS ON PROTECTING ITS FRAGILE ENVIRONMENT

The drying up of Kerala's Bharathapuzha River due to deforestation, sand mining, and erratic rainfall highlights how environmental degradation threatens India's economy, livelihoods, and sustainable development goals.

Why Environment is Critical for India's Economic Growth

- The environment provides essential resources such as water, land, forests, and biodiversity that support economic activities.
- Healthy ecosystems regulate climate, maintain soil fertility, and ensure water security.
- Environmental degradation increases the economic costs of disasters, pollution, and resource scarcity.
- Sustainable economic growth is possible only when ecological balance is maintained.

Monsoon and India's Economy

- The monsoon remains the backbone of Indian agriculture and rural livelihoods.
- Nearly half of India's workforce depends directly or indirectly on agriculture.
- Increasing monsoon variability threatens food security, farmer incomes, and economic stability.
- Climate change and environmental degradation are amplifying extreme weather events.

Environmental Degradation and Climate Risks

- Deforestation, land-use change, and unsustainable urbanization are increasing climate vulnerability.
- Degraded ecosystems reduce nature's ability to buffer floods, droughts, and heatwaves.
- Environmental changes contribute to landslides, flash floods, cloudbursts, and GLOFs.
- These disasters impose significant social and economic costs.

Significance of Weather and Climate Prediction

- India's improved weather forecasting has reduced disaster-related deaths and economic losses.
- Early warning systems help protect lives, agriculture, and infrastructure.
- Accurate climate predictions support resilient development planning.
- Such investments are essential for achieving the vision of Viksit Bharat.

Need for Environmental Prediction

- Environmental prediction should integrate weather, climate, ecosystems, and human activities.
- It can guide sustainable urbanization, agriculture, and infrastructure development.
- It will help identify environmental risks before they become disasters.
- It can strengthen long-term resilience and resource management.

Way Forward

- Integrate environmental protection into all development planning.
- Promote climate-resilient agriculture and sustainable urbanization.
- Restore forests, rivers, wetlands, and coastal ecosystems.
- Develop comprehensive environmental prediction systems.
- Adopt nature-based solutions for climate adaptation and disaster risk reduction.

Conclusion

- India's journey towards Viksit Bharat 2047 depends on recognizing that economic prosperity and environmental sustainability are mutually reinforcing. Protecting the environment is not a constraint on development but a prerequisite for long-term growth, resilience, and well-being.

INDIA LOSING ABILITY TO BUILD ITS OWN SCIENTIFIC INSTRUMENTS: CLIMATE SCIENCE REPORT

The **Mega Science Vision-2035 (MSV) Report on Climate Research** has warned that India is increasingly dependent on imported scientific instruments, weakening the country's ability to generate reliable climate data and undermining scientific self-reliance at a time when climate challenges are intensifying.

Key Findings of the Report

Loss of Indigenous Instrument-Making Capacity

- India has nearly lost the capability to design and manufacture advanced scientific instruments.
- Climate observations increasingly depend on imported equipment.
- Many instruments remain uncalibrated for years, affecting data quality.
- Incorrect climate data has raised concerns about the credibility of Indian research.
- This trend contradicts the vision of **Atmanirbhar Bharat**.

Concerns Regarding Renewable Energy Expansion

- Large-scale solar and wind installations may have long-term environmental impacts.
- Effects on local climate, land use, biodiversity, and ecosystems remain poorly understood.
- Scientists call for long-term studies on the climate consequences of renewable energy expansion.
- The report nevertheless supports continued prioritization of renewable energy.

Major Challenges Identified

Scientific and Technological Challenges

- Dependence on foreign instruments and technologies.
- Lack of indigenous Earth System Models developed from first principles.
- Weak research ecosystem for climate technology innovation.
- Limited capacity for sensor development and calibration.

Institutional Challenges

- Procurement rules often hinder acquisition of specialized research equipment.
- Weak integration between environmental, climate, and health databases.
- Inadequate communication of climate science to policymakers.
- Absence of a comprehensive climate-policy integration framework.

Significance for India

- Reliable climate observations are essential for weather forecasting and disaster management.
- Accurate data helps monitor heatwaves, monsoon variability, glacier melt, and sea-level rise.
- Indigenous technology strengthens scientific sovereignty and national security.
- Better climate science supports evidence-based policymaking and adaptation planning.
- Supports India's commitments under the Paris Agreement and climate-resilient development.

Recommendations of the MSV Report

- Develop indigenous scientific instruments and sensor technologies.
- Build an Indian Earth System Model tailored to local conditions.
- Strengthen research on clean energy and carbon capture technologies.
- Establish integrated climate-health surveillance systems.
- Develop mechanisms to assess the social cost of carbon.
- Operationalize the "polluter pays" principle.
- Improve climate communication and capacity building.

Way Forward

- Promote indigenous R&D and scientific manufacturing ecosystems.
- Strengthen collaboration among academia, industry, and government.
- Invest in calibration laboratories and quality assurance systems.
- Create flexible procurement mechanisms for research

institutions.

- Integrate climate science into development planning and governance.
- Balance renewable energy expansion with ecological sustainability.

Conclusion

- The MSV-2035 report highlights that scientific self-reliance is as important as energy self-reliance. Developing indigenous climate research capabilities, reliable instruments, and advanced Earth-system science is essential for improving climate resilience, strengthening policy decisions, and achieving the vision of a sustainable and self-reliant India.

HEAT-RELATED DEATHS OF ASIATIC LION CUBS IN GIR FOREST

The death of eight Asiatic lion cubs in Gujarat's Gir forest due to heat stress and weakened immunity highlights the growing impact of extreme weather events on wildlife. The incident underscores the vulnerability of endangered species to climate change and habitat-related stresses.

Key Findings

- Eight Asiatic lion cubs died due to heat-related stress and low immunity.
- Investigations ruled out **Babesia infection** and other viral diseases.
- The deaths occurred in Gir Somnath and Amreli districts.
- Samples were tested at the Gujarat Biotechnology Research Centre (GBRC), Gandhinagar.
- No evidence of an infectious disease outbreak was found.

Measures Taken by Forest Authorities

- Intensive surveillance was conducted in affected areas.
- Lions within a 10-km radius were monitored.
- Seventeen lions showing signs of illness were quarantined and treated.
- Twelve lions have already been released into the wild.
- The remaining five lions have recovered and will be released soon.
- Around 600 lions underwent deworming and tick-control treatment.

Significance

- **Indicator of Climate Change Impacts**
  - Rising temperatures can directly affect wildlife survival.
  - Young animals are particularly vulnerable to heat stress.
  - Extreme weather events are becoming more frequent and intense.
- **Importance of Wildlife Health Monitoring**
  - Early disease detection helps prevent large-scale mortality.
  - Strengthens conservation efforts for endangered species.
  - Enhances preparedness against zoonotic and wildlife diseases.
- **Conservation of Asiatic Lions**
  - Gir forest is the world's only natural habitat of the Asiatic lion.
  - The species is a major conservation success story of India.
  - Any threat to the population has national and global significance.

Challenges

- Increasing heatwaves and climate extremes.
- Disease susceptibility due to environmental stress.
- Habitat fragmentation and human-wildlife interactions.
- Dependence of the entire wild population on a single geographic region.
- Risk of future disease outbreaks such as Canine Distemper Virus (CDV).

About Babesia

- Babesia is a tick-borne parasitic disease.
- It infects red blood cells.
- Causes fever, weakness, anaemia, and reduced

immunity.

- Can affect domestic and wild animals.

Way Forward

- Strengthen climate-resilient wildlife management.
- Expand habitat and prey-base conservation.
- Improve veterinary surveillance and disease monitoring.
- Establish additional secure habitats for Asiatic lions outside Gir.
- Integrate climate adaptation measures into wildlife conservation planning.

Conclusion

The Gir lion cub deaths serve as a reminder that climate change is emerging as a significant conservation challenge. Protecting the Asiatic lion requires not only disease management but also long-term strategies to address heat stress, habitat resilience, and climate-related threats to wildlife.

BEYOND VERDICTS: KEY JUDICIAL INTERVENTIONS

Draft Regulations for Use of AI in Courts, 2026

- Prepared by the Supreme Court's AI Committee, the draft regulations provide a framework for the responsible use of AI in India's judiciary. AI can be used only as an assistive tool for tasks such as legal research, translation, and administration, while judicial decision-making remains exclusively with humans. The regulations emphasize fairness, transparency, data privacy, accountability, and oversight through dedicated AI governance bodies.

Supreme Court on DNA Testing in Paternity Disputes

- The Supreme Court has balanced a **child's right to know their biological parentage** with an **alleged father's right to privacy**, holding that **DNA tests should not be ordered routinely**. However, in cases where paternity is genuinely disputed and necessary for delivering justice, courts may direct a DNA test after carefully weighing the competing rights involved.

Right to Be Forgotten

- In **Laksh Vir Singh Yadav v. Union of India & Ors.**, the Delhi High Court recognized the **Right to Be Forgotten** as an integral part of the **right to privacy under Article 21**. It allows individuals to seek the removal or restricted access to personal information that no longer serves a legitimate public purpose.
- The Court laid down principles for **de-indexing** (removing a person's name from search results without deleting records) and **masking** (replacing names with neutral identifiers such as "XYZ") in judicial records, particularly in cases ending in acquittal or discharge. However, this relief is generally unavailable in cases involving **women, children, or breach of public trust**.

Supreme Court on CBSE Result of Gulf-Based Student

- The Supreme Court issued notice to **CBSE** on a plea filed by a Class XII improvement examination student from **Saudi Arabia**, whose result was withheld after several exams in Gulf countries were cancelled due to regional security tensions.
- Observing that the matter concerns the student's academic future, the Court directed CBSE to respond promptly, stating that a student cannot be made to suffer due to circumstances beyond his control.
- The petitioner argued that he should be covered under CBSE's **special assessment scheme** for affected West Asian countries, which allows evaluation based on school records when examinations could not be conducted. The case raises issues of **equality (Article 14)** and the **right to education and dignity under Article 21**.

'Swadeshi Jurisprudence' and AI in Judiciary

- Speaking at Oxford, Chief Justice of India **Surya Kant** emphasized the need to develop a **"Swadeshi Jurisprudence"** rooted in India's constitutional values, social realities, and linguistic diversity rather than relying solely on imported legal and technological models.
- He revealed that the judiciary is working towards an **indigenous AI ecosystem**, including Indian Large Language Models (LLMs), to support judicial functions. The proposed AI framework will be guided by **human oversight, fairness, transparency, accountability, constitutional compliance, and data protection**, with AI serving as an assistive tool to improve access to justice, reduce delays, and enhance judicial efficiency.
- He stressed that technology must remain a servant of constitutional values, not their substitute.

ETHICS - CASE STUDY

Q) A State Public Service Commission (SPSC) is conducting a highly competitive recruitment examination for government jobs. Two days before the examination, a confidential report reaches the Commission's Secretary that the question paper has been leaked through a network involving coaching institutes, middlemen, and a few officials of the printing agency.

The examination is scheduled to be held across the State, with over 10 lakh candidates having already made travel and accommodation arrangements. Cancelling the examination at the last moment may cause significant inconvenience, financial loss, and public unrest. However, proceeding with the examination may compromise fairness and merit.

An internal inquiry reveals preliminary evidence of a leak, but the extent of its spread is unclear. Some senior officials argue that the examination should proceed to avoid administrative embarrassment and public criticism. Others insist that even a suspicion of leakage undermines the credibility of the institution.

As the Chairperson of the SPSC, you are entrusted with ensuring fairness, transparency, and public trust in the examination process.

Questions:

a. What are the ethical issues involved in the above case?

b. Identify the stakeholders and their competing interests.

c. What options are available to you? Evaluate their merits and demerits.

d. What course of action would you adopt and why?

e. Suggest long-term measures to prevent question paper leaks and strengthen the integrity of public examinations.

ETHICS - EXAMPLES

1. **Resilience**: After a road accident and living with brittle bone disease, Pratik Shingare faced severe accessibility barriers and was denied re-entry into school. He later founded ***StairlessJourney***, which verifies and maps accessible spaces to help people with disabilities navigate cities with greater confidence and dignity.
2. **Gender Ethics**: Kerala has proposed "Project Menstrual Dignity", under which schoolgirls may be granted up to three days of menstrual leave per month, along with weekend catch-up classes to ensure academic continuity. The initiative aims to make schools more gender-sensitive and inclusive.
3. **Leadership**: In Dasada village near the Little Rann of Kutch, Niyati Kukadia's venture works with the Mir community to revive their traditional beadwork and provide sustainable livelihoods to women artisans. The initiative trains artisans, modernises designs, and links products like jewellery and décor items to local tourism and national/ international markets
4. **Social Responsibility:** In Aragam village, Bandipora district, Jammu and Kashmir, a community-led "book village" initiative by Sarhad NGO has transformed homes into decentralized libraries, giving residents, especially children and dropouts access to books on literature, history, and competitive exams.
5. **Courage**: The Malviya Nagar (Hauz Rani, South Delhi) fire incident was a major blaze in a hotel building that killed around 21 people and injured several others due to smoke and entrapment. During the rescue, local mattress seller Riyazuddin Mansuri laid mattresses on the road to cushion people jumping from upper floors, helping save lives.
6. **Justice/Fairness:** During Punjab's "Sitaare Zameen Te" felicitation programme, a girl student questioned the policy of ranking students with equal marks based on age, prompting Chief Minister Bhagwant Mann to direct that all such students be awarded a joint first position instead.
7. **Environmental Ethics**: In Ankleshwar, Gujarat, Vedant and Aditi founded **Co2ncrete**, a startup that converts industrial waste like fly ash, silica sludge, and construction debris into eco-friendly, cement-free bricks and prefabricated housing materials.
8. **Accountability**: Sarthak Sidhant, a 17-year-old Class 12 student from Ranchi, Jharkhand, gained attention for exposing alleged irregularities in CBSE's On-Screen Marking (OSM) evaluation and its tendering process through an investigative blog. He later appeared before a Parliamentary Standing Committee on Education as one of the youngest student whistleblowers on education system transparency.

MODEL ESSAY

"Judge a man by his questions rather than his answers"

Introduction

- Quote by Enlightenment philosopher **Voltaire**
- Reflects the idea that **curiosity is a deeper marker of intelligence than knowledge itself**.
- The quote shifts focus from "what one knows" to "what one wants to know"

Why Questions are More Important Than Answers?

- **Reveal critical thinking:** Thoughtful questions show how a person analyses and breaks down problems.
- **Intellectual Humility:** Asking questions shows humility and counters the **Dunning–Kruger effect**, a bias where people overestimate their knowledge and ability.
- **Indicate curiosity**: Curiosity is a strong predictor of lifelong learning.
- **Expose values and priorities**: What a person asks reflects what they consider important.
- **Drive innovation and discovery:** Major breakthroughs in science and technology begin with questions, not answers.
- **Prevent misinformation and blind acceptance:** In an era of fake news and AI-generated content, questioning becomes a tool of verification.

Real Life Examples

- **The Polaroid camera** was invented because inventor Edwin Land's 3-year-old daughter asked a question on vacation: ***"Why do we have to wait to see the picture?"***
- Alexander Fleming discovered **penicillin** after noticing bacteria dying around mold and asking the question, "Why is it happening?"
- Toyota's manufacturing success is rooted in the **"Five Whys" technique**, where employees repeatedly ask "Why?" up to five times to identify the root cause of a defect.

Limitations

- **Answers remain essential:** Without solutions, questions alone cannot solve problems.
- **Weaponized inquiry:** Leading questions in courtrooms are designed to manipulate the narrative rather than seek truth.
- **Evasion of responsibility:** When an answer is morally or legally required, responding with a question becomes an act of cowardice rather than intellect.
- **Excessive questioning:** Over-analysis can delay decisions and reduce efficiency.
- **Not all questions are meaningful**: Superficial or irrelevant questions do not reflect intelligence.

Way Forward

- **Promote inquiry-based education:** Shift from rote memorisation to critical thinking pedagogy - Encourage students to frame "why" and "how" questions.
- **Strengthen institutional openness:** Schools, universities, and governments should encourage questioning culture.
- **Develop media literacy:** Citizens must be formally trained to interrogate digital information.
- **Encourage ethical questioning in governance:** Policy design should include stakeholder questioning mechanisms.

Conclusion

- Judging a person by their questions shifts focus from passive knowledge to active intelligence.
- Ultimately, societies progress not because they have all the answers, but because they constantly ask better questions

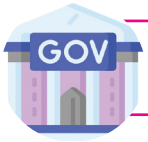
Sample Quote

- *Strive not to be a success, but rather to be of value - Albert Einstein*
- *No man is rich enough to buy back his past- Oscar Wilde*
- *The price of apathy towards public affairs is to be ruled by evil men- Plato*

MAINS JOT DOWN

GS I: *MINERALS*

- The **India–UK Critical Minerals Global Supply Chain Observatory (GSCO)**, launched under a 2025 bilateral initiative and formalized through a research collaboration agreement in 2026, is a joint project of **TEXMiN (DST), IIT (ISM) Dhanbad, and the University of Cambridge**.
- It aims to develop a **data-driven platform** for monitoring and analysing global critical mineral supply chains. The observatory will help identify supply risks and disruptions, generate market intelligence, support evidence-based policymaking, and strengthen the objectives of India's **National Critical Mineral Mission (NCMM)**.



GS II: *GOVERNANCE*

- The **E-Jagriti platform** of the **Department of Consumer Affairs** recently won the **National Awards for e-Governance 2026**. It is a digital platform that integrates and computerizes **Consumer Commissions across India**, enabling transparent, efficient, and faster resolution of consumer disputes through end-to-end digital case management.

GS III: *DEFENCE*

- IIndia successfully conducted the flight test of the indigenously developed **RudraM-II**, an air-to-surface missile launched from an airborne platform.
- Developed by **DRDO's Research Centre Imarat (RCI), Hyderabad**, along with other partner organizations, the missile enhances India's precision strike capabilities and marks a significant step towards strengthening indigenous defence technology under the **Aatmanirbhar Bharat** initiative.

GS III: *INDIAN ECONOMY*

- India's fisheries and seafood sector remains a key contributor to **food security, employment, exports, and sustainable livelihoods**. In **FY 2025–26**, India achieved an **all-time high seafood export** of **19.72 lakh metric tonnes**, valued at **USD 8.46 billion**. **Frozen shrimp** continued to be the leading export item, accounting for **40.19% of export volume** and **66.52% of export earnings**, followed by **frozen fish** and **dried seafood**. The **United States and China** were the top destinations for Indian seafood exports.

GS III: *RENEWABLE ENERGY*

- The Union Minister for Petroleum and Natural Gas launched **E85 fuel**, a blend containing **80–85% ethanol and 15–20% petrol**, specifically designed for **Flex-Fuel Vehicles (FFVs)**. FFVs can operate on varying ethanol-petrol blends ranging from **E20 to E100**. The adoption of E85 fuel can help reduce **greenhouse gas emissions**, lower dependence on fossil fuels, and promote cleaner transportation.

- The **Technology Development Board (DST)** has supported the establishment of a commercial-scale facility for producing **Abhilasha Biofuels (ABF)**, a **2nd Generation (2G) diesel-equivalent biofuel** and renewable alternative to naphtha.
- Produced from **non-food biomass** such as agricultural residues, crop stubble, rice straw, and sugarcane bagasse, ABF is a **drop-in fuel** that can directly replace conventional diesel without requiring modifications to existing engines, fuel systems, or distribution infrastructure.

GS II: *INTERNATIONAL RELATIONS*

- Prime Minister Narendra Modi held talks with Venezuela's Acting President **Delcy Rodríguez** in New Delhi, reviewing bilateral ties and reaffirming cooperation within the **Global South**. India and Venezuela share strong relations in trade, energy, and people-to-people exchanges.
- Bilateral trade stood at about **US$ 679 million in FY 2025–26**, with India exporting pharmaceuticals, machinery, cotton, and petroleum products, while importing crude oil, metals, and minerals. Venezuela, home to one of the world's largest proven oil reserves, has emerged as **India's third-largest crude oil supplier**, strengthening the two countries' energy partnership.
- Cultural ties are supported by Indian spiritual organizations such as **Sathya Sai Organization, Brahma Kumaris, and Radha Soami Satsang**, which have active centres in Venezuela.

- The Prime Minister of India and Myanmar's President reviewed bilateral, regional, and global issues of mutual interest, including cooperation in **AI and space technologies**, and welcomed the growing use of the **Rupee–Kyat settlement mechanism** to facilitate bilateral trade.
- Myanmar holds significant importance for India as it connects the country's **Neighbourhood First, Act East, and MAHASAGAR** policies.
- Key areas of cooperation include connectivity projects such as the **India–Myanmar–Thailand Trilateral Highway** and the **Kaladan Multi-Modal Transit Transport Project**, border security and counter-insurgency efforts along the **1,643-km shared border**, and deep cultural ties rooted in a shared **Theravada Buddhist heritage**.

GS III: *ENVIRONMENT*

- A recent study by **Azim Premji University** warns of severe, hyper-local climate impacts across India's **11,000-km coastline**.
- The study highlights that a **15 cm sea-level rise by 2050** could significantly accelerate coastal erosion, while rapid ocean warming at **0.27°C per decade** is increasing the intensity of tropical cyclones.
- It also projects that nearly **40 coastal districts** may experience summer temperature increases of over **1°C**, pushing them closer to dangerous heat-humidity thresholds.

- The **Jai Prakash Narayan Bird Sanctuary (Surha Tal)** in **Ballia district, Uttar Pradesh**, has been designated as **India's 100th Ramsar Site**. It is a natural, perennial **oxbow lake** formed from a cut-off meander of a river. Established in **1991** by consolidating land from 45 villages and renamed in **2002** in honor of **Jai Prakash Narayan**, the sanctuary covers about **3,432 hectares**, expanding to nearly **25,000 hectares during the monsoon season**.

CHERRYPICKS OF THE WEEK

BOLIDES:

- A bolide is an exceptionally bright meteor (fireball) that explodes in Earth's atmosphere, producing intense flashes of light, sonic booms, and shock waves. A **meteoroid** is a small asteroid or comet fragment in space; it becomes a **meteor** when it enters the atmosphere and a **meteorite** if it reaches the ground.

FLEX FUEL VEHICLES (FFVS):

- FFVs are equipped with modified internal combustion engines that can operate on petrol-ethanol blends ranging from **E20 to E85 (up to 85% ethanol)**. They help reduce **carbon monoxide emissions by up to 77%**, lower dependence on imported crude oil, and can save India around **₹1.44 lakh crore in foreign exchange**.

PEATLANDS:

- Peatlands are waterlogged wetland ecosystems formed from partially decomposed organic matter (peat), including **bogs, fens, mires, and swamps**. Though they cover only **3–4% of Earth's land area**, they store nearly **30% of global soil carbon**, about twice the carbon contained in the world's forests.
- They act as vital **carbon sinks**, regulate water flow, reduce floods and droughts, and support rich biodiversity.

BLUE MICROMOON:

- A **Blue Micromoon** is a rare celestial event that occurs when a **Blue Moon** (an additional full moon in a season or the second full moon in a month) coincides with a **Micromoon**, when the Moon is near its farthest point from Earth and appears slightly smaller and dimmer.
- Despite its name, the Moon does **not appear blue** unless unusual atmospheric conditions are present.

GENE SILENCING:

- It is a biological process in which a cell reduces or blocks the expression of a specific gene, preventing the production of its corresponding protein. By intercepting the genetic instructions encoded in DNA, it acts as a natural regulatory mechanism that helps organisms control various cellular functions.