



Guiding Dreams, Empowering Future
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EXCLUSIVE CURRENT AFFAIRS BULLETIN

E20 FUEL : FROM APRIL 1, 2026

Context

- From April 1 onwards, the Government of India is implementing E20 fuel across the country.
- India is promoting E20 fuel as part of its strategy to reduce dependence on fossil fuels and improve energy security.
- E20 rollout is a major step under India's biofuel policy and ethanol blending programme.

What is E20 Fuel?

- E20 fuel is a blend of 20% ethanol and 80% petrol.
- Ethanol is an alcohol-based biofuel produced mainly from plant sources.
- It is renewable and cleaner compared to conventional fossil fuels.

Ethanol Blending Programme (EBP)

- Launched in 2003 to promote blending of

ethanol with petrol.

- Blending increased gradually from around 1–2% to nearly 20% in recent years.
- Target of 20% blending has been advanced to achieve energy goals.

Sources of Ethanol

- **First-generation sources:**
 - Sugarcane (molasses, sugarcane juice)
 - Food grains like maize and rice
- Second-generation sources:
 - Agricultural residues such as straw
 - Biomass and waste materials

Benefits of E20 Fuel

- **Energy Security:**
 - Reduces dependence on crude oil imports.
 - Enhances domestic fuel production.
- **Environmental Benefits:**
 - Lower carbon emissions compared to petrol.
 - Reduces air pollution and

greenhouse gases.

- **Economic Benefits:**
 - Saves foreign exchange on fuel imports.
 - Provides income support to farmers.
- **Agricultural Impact:**
 - Creates additional demand for crops like sugarcane and maize.
 - Supports rural economy.

Vehicle Compatibility

- Older vehicles may face issues with E20 fuel.
- New vehicles are being designed to be E20 compatible.
- Flex-fuel engines can run on higher ethanol blends.

Technical Challenges

- Ethanol has lower energy content than petrol, affecting mileage.
- Corrosion issues in engines and fuel systems.
- Need for modification in engines and infrastructure.

▶ Continued on P2



» From P1

Infrastructure Requirements

- Expansion of ethanol production capacity.
- Development of storage and distribution networks.
- Adaptation of fuel stations for E20 supply.

Policy Support

- National Policy on Biofuels promotes ethanol blending.
- Government incentives for ethanol production.
- Support for setting up distilleries and bio-refineries.

Global Perspective

- Brazil uses high ethanol blends (up to E85 and above).
- USA uses E10 widely and promotes higher blends.
- India is moving towards E20 as a balanced approach.

Challenges and Concerns

- Dependence on water-intensive crops like sugarcane.
- Food vs fuel debate due to use of food grains.
- Supply chain and production constraints.
- Environmental concerns related to crop cultivation.
- E20 fuel may reduce efficiency in older engines and cause lower mileage.

Way Forward

- Promote second-generation ethanol production.
- Develop flex-fuel vehicle ecosystem.
- Improve efficiency and reduce environmental impact.
- Ensure sustainable agricultural practices.

Significance for India

- Supports transition to clean energy.
- Reduces import bill and improves economy.
- Strengthens rural development and farmer income.
- Aligns with climate change commitments.

Conclusion

- E20 fuel represents a strategic move towards cleaner and more sustainable energy in India. While it offers multiple economic and environmental benefits, addressing challenges related to vehicle compatibility, infrastructure, and sustainability is crucial for long-term success.

Prelims Practice Question

Q. With reference to E20 fuel, consider the following statements:

1. E20 fuel contains 20% ethanol and 80% petrol.
2. Ethanol is a non-renewable fossil fuel.
3. E20 fuel helps reduce dependence on crude oil imports.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 2 and 3 only
- (c) 1 only
- (d) 1, 2 and 3

Answer: (a)

Context

- Artemis II is part of NASA's Artemis Programme aimed at returning humans to the Moon.
- It is the first crewed mission under Artemis after the success of Artemis I (uncrewed test flight).
- The mission marks a major step in deep space exploration beyond Low Earth Orbit.

Artemis Programme Overview

- Artemis Programme is led by NASA in collaboration with international partners.
- The objective is to establish a sustainable human presence on the Moon.
- It also acts as a stepping stone for future human missions to Mars.
- The programme includes multiple missions: Artemis I, II, III and beyond.

Artemis II Mission Details

- Artemis II will carry astronauts around the Moon and back to Earth.
- It will not land on the Moon but will test life-support systems and crew operations.

ARTEMIS II MISSION

- The mission duration is expected to be around 10 days.
- It aims to validate spacecraft performance with humans onboard.

Crew of Artemis II

- The mission will carry four astronauts.

- It includes NASA astronauts and one Canadian Space Agency astronaut.
- This reflects growing international cooperation in space missions.

Spacecraft and Launch System

- Space Launch System (SLS) is the powerful rocket used for the mission.
- Orion spacecraft will carry the crew.
- Orion is designed for deep space missions with advanced life-support systems.

- It ensures safe travel beyond Earth's orbit and back.

Mission Profile

- The spacecraft will travel in a free-return trajectory around the Moon.
- This trajectory ensures that the spacecraft naturally returns to Earth.
- It minimizes risk in case of system failures.

Significance of Artemis II

- It is the first human mission to travel beyond low Earth orbit since Apollo missions.
- It demonstrates advanced capabilities in human spaceflight.
- It strengthens international partnerships in space exploration.
- It enhances scientific understanding of deep space conditions.

Challenges & Concerns

- High cost of mission and programme.
- Technical risks associated with deep space travel.
- Radiation exposure to astronauts.
- Need for long-term sustainability of lunar missions.

Relevance for India

- Provides lessons for ISRO's

Gaganyaan mission.

- Opens opportunities for collaboration in space exploration.
- Strengthens global space governance frameworks.

Conclusion

Artemis II represents a crucial step in humanity's return to deep space exploration. It combines advanced technology, international cooperation, and long-term vision for lunar and Mars missions, making it a milestone in modern space exploration.

Prelims Practice

Question

Q. With reference to the Artemis II mission, consider the following statements:

1. It is the first crewed mission under NASA's Artemis Programme.
2. It involves landing humans on the Moon.
3. It uses the Orion spacecraft for carrying astronauts.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 2 and 3 only
- (c) 1 only
- (d) 1, 2 and 3

Answer: (a)



QDENGGA (TAK-003) DENGUE VACCINE

Context

- Qdenga is a dengue vaccine developed to combat dengue infections, which are a major public health concern in tropical countries like India.
- Dengue is caused by dengue virus transmitted by Aedes mosquitoes and has four distinct serotypes.

About Qdenga Vaccine

- Qdenga (TAK-003) is developed by Takeda, a pharmaceutical company.
- It is a live-attenuated tetravalent vaccine.
- It provides protection against all four dengue virus serotypes (DENV-1, DENV-2, DENV-3, DENV-4).
- It is administered in two doses with a gap of three months.

Features of Qdenga Vaccine

- It does not require prior dengue infection for administration.

- It is suitable for both seropositive and seronegative individuals.
- It reduces severity, hospitalization, and complications from dengue.

Clinical Trials and Effectiveness

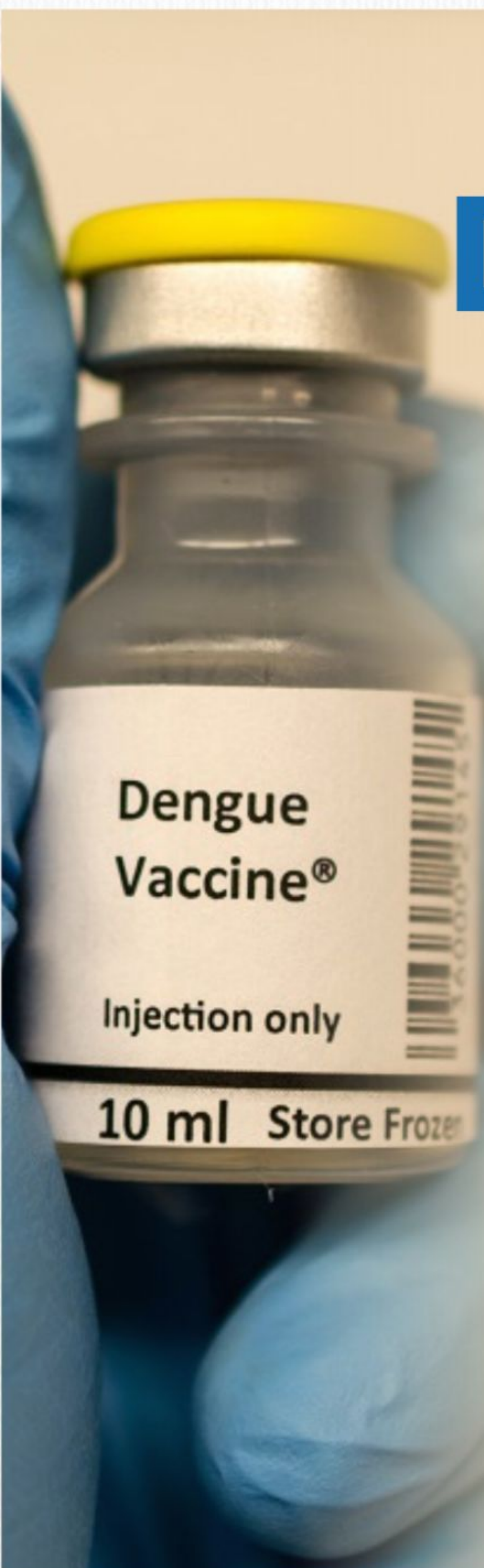
- The vaccine has been tested in over 28,000 participants globally.
- It has shown strong protection against severe dengue and hospitalization.
- Effectiveness varies across serotypes but remains significant overall.

Approval and Status

- Approved in several countries including in parts of Europe and Asia.
- In India, it is under regulatory review and discussion for inclusion.
- It is targeted for individuals aged 4 to 60 years.

Comparison with Dengvaxia

- Dengvaxia required prior infection screening.
- Dengvaxia posed risks in seronegative individuals.



- Qdenga is safer as it does not require such screening.

Public Health Significance

- Helps reduce dengue burden in endemic countries.
- Can lower mortality and pressure on healthcare systems.
- Supports India's goal of better disease control.

Limitations

- It does not prevent transmission of dengue virus.
- Effectiveness varies by serotype and region.
- Cost and accessibility may limit widespread use.

Challenges in India

- Large population and high disease

burden.

- Need for mass immunization strategies.
- Infrastructure and cold chain requirements.
- Public awareness and acceptance issues.

Way Forward

- Strengthen vaccination strategy along with vector control.
- Increase awareness about dengue prevention.
- Invest in indigenous vaccine development like DengiAll.
- Improve surveillance and early detection systems.

Conclusion

Qdenga represents a significant advancement in dengue prevention by offering broader protection and safer administration. However, its success in India

depends on affordability, accessibility, and integration with existing public health measures.

Prelims Practice Question

Q. With reference to dengue vaccines, consider the following statements:

1. Qdenga is a tetravalent vaccine targeting all four dengue serotypes.
2. It requires prior dengue infection before administration.
3. It is a live-attenuated vaccine.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 2 and 3 only
- (c) 1 only
- (d) 1, 2 and 3

Answer: (a)

Context

- India is increasingly adopting Artificial Intelligence (AI) and data analytics in tax administration.
- Aim is to improve compliance, reduce tax evasion, and enhance efficiency in governance.

What is AI-Driven Tax Governance?

- Use of AI, machine learning, and big data analytics in tax systems.
- Helps in:
 - Detecting tax evasion
 - Risk profiling of taxpayers
 - Automating assessments
 - Improving decision-making

Important Initiatives in India

- **Project Insight:**
 - Launched by Income Tax Department.
 - Uses big data and AI to track high-value transactions.
 - Integrates multiple data sources like banks, GST, and financial institutions.
- **Faceless Assessment Scheme:**
 - Eliminates human interface.
 - Reduces corruption and discretion.
 - Uses automated allocation and digital communication.
- **GST Analytics:**
 - Data matching between GST

AI-DRIVEN TAX GOVERNANCE IN INDIA



returns and invoices.

- Identifies fake invoicing and tax fraud.

Benefits of AI in Tax Governance

- **Increased Tax Compliance:**
 - Better detection of discrepancies.
 - Encourages voluntary compliance.
- **Reduction in Tax Evasion:**
 - Identifies hidden income patterns.
 - Tracks suspicious transactions.
- **Efficiency and Transparency:**
 - Faster processing of returns.
 - Reduced human bias and corruption.
- **Better Revenue Collection:**
 - Expands tax base.
 - Improves government fiscal capacity.

Challenges and Concerns

- **Data Privacy Issues:**

- Large-scale data collection raises privacy concerns.

- **Algorithmic Bias:**

- Risk of unfair targeting due to flawed models.

- **Digital Divide:**

- Small taxpayers may struggle with digital systems.

- **Cybersecurity Risks:**

- Sensitive financial data vulnerable to breaches.

Way Forward

- Strengthen Data Protection Framework.
- Ensure transparency in AI algorithms.
- Build taxpayer awareness and digital literacy.
- Invest in secure IT infrastructure.
- Regular audits of AI systems.

Significance

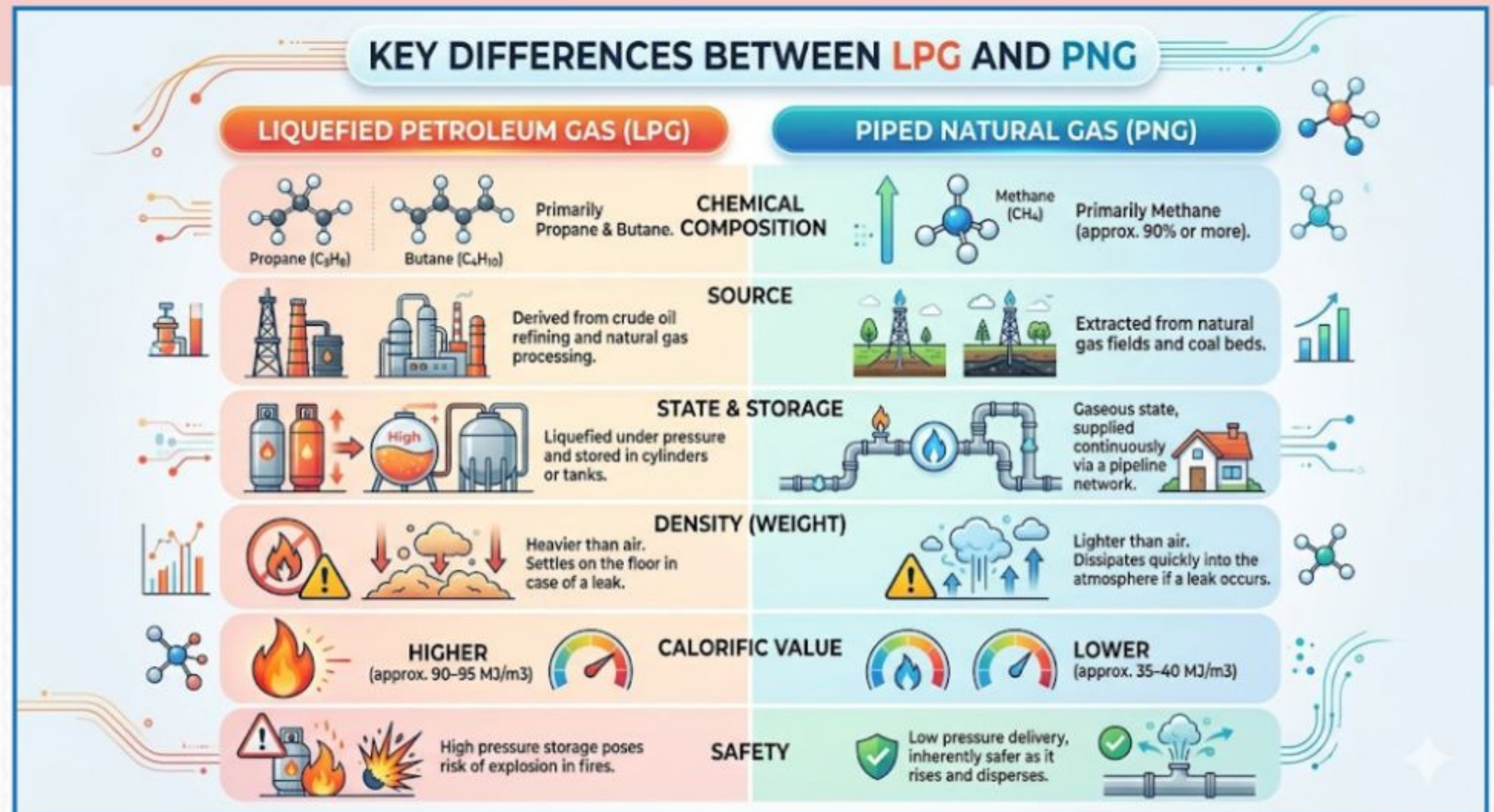
- Supports Digital India initiative.
- Enhances ease of doing business.
- Strengthens governance and accountability.
- Aligns with global best practices in tax administration.

Conclusion

AI-driven tax governance marks a major shift towards smart and transparent administration in India. While it improves compliance and efficiency, balancing technology with privacy,

▶ Continued on P5

INDIA'S SHIFT TOWARDS PNG FROM LPG



Context

- India is promoting a transition from Liquefied Petroleum Gas (LPG) to Piped Natural Gas (PNG) for domestic cooking.
- The shift is driven by energy security concerns after disruptions in LPG supply through the Strait of Hormuz.

LPG vs PNG –

Basic Differences

- LPG consists of propane and butane and is stored in pressurized cylinders.
- PNG is mainly methane and is supplied through pipelines directly to households.
- LPG is heavier than air, while PNG is lighter than air, making it relatively safer.
- LPG requires booking and delivery, whereas PNG provides continuous supply.

Supply and Logistics

- LPG involves a complex supply chain including bottling plants, distributors, and transportation.
- PNG is supplied through City Gas Distri-

bution (CGD) networks ensuring uninterrupted 24/7 supply.

- PNG eliminates the need for cylinder storage and handling.

Efficiency and Usage

- LPG has higher calorific value and heats faster.
- PNG is more efficient in continuous usage systems.
- Conversion from LPG to PNG requires modification of burners and nozzles.

Status in India

- India has around 33 crore LPG connections.
- PNG connections are about 1.5 crore, showing limited penetration.
- Government aims to expand PNG connections to about 12 crore by 2034.
- Domestic natural gas resources could support nearly 30 crore connections.

Reasons for Shift to PNG

- High Import Dependence:** – Around 60% of LPG demand is met through imports.

– Nearly 90% of LPG imports pass through the Strait of Hormuz.

- Energy Security:** – Supply disruptions expose vulnerability of LPG dependence.
- Fiscal Burden:** – LPG subsidies impose pressure on government finances.
- Cleaner Fuel:** – Natural gas is a cleaner-burning fuel with lower emissions.

Domestic Production and Sources

- PNG is sourced from domestic gas fields such as:
 - Krishna-Godavari (KG) Basin
 - Assam
 - Tripura
- KG Basin is a major contributor to India's natural gas production.

Infrastructure Development

- Expansion of gas pipeline network is crucial.

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▶ From P4

fairness, and inclusiveness is essential for sustainable tax reforms.

Prelims Practice Question

Q. With reference to AI-driven tax governance in India, consider the following statements:

- Project Insight uses big data analytics to track financial transactions.
- Faceless Assessment eliminates

physical interaction between taxpayer and officer.

3. AI-based tax systems completely eliminate tax evasion.

Which of the statements given above is/are correct?

- 1 and 2 only
- 2 and 3 only
- 1 only
- 1, 2 and 3

Answer: (a)



►► **From P5**

- India has around 25,000 km of pipeline network with further expansion under-way.
- City Gas Distribution networks are being expanded across urban areas.

Advantages of PNG

- Continuous and reliable supply.
- Safer due to lighter-than-air property.
- Lower operational inconvenience compared to LPG.
- Reduces import dependence and improves energy security.

Challenges in Transition

- Limited pipeline infrastructure in many regions.
- High initial cost of pipeline installation.
- Last-mile connectivity issues in urban and rural areas.
- Consumer resistance and lack of awareness.

- Technical challenges in retrofitting appliances.

Policy Measures

- Government is promoting PNG through regulatory reforms.
- Faster approvals for pipeline projects.
- Restrictions on simultaneous use of LPG and PNG in households.
- Incentives to expand City Gas Distribution networks.

Overall Significance

- Strengthens India's energy security.
- Reduces dependence on volatile global markets.
- Supports environmental sustainability.
- Enhances ease of living through uninterrupted fuel supply.

Conclusion

- India's shift from LPG to PNG reflects a strategic move towards secure, cleaner,

and efficient energy systems. While PNG offers long-term benefits in terms of energy security and sustainability, challenges related to infrastructure, affordability, and awareness must be addressed to ensure inclusive and successful transition.

Prelims Practice Question

Q. With reference to LPG and PNG, consider the following statements:

1. LPG is mainly composed of methane.
2. PNG is supplied through pipeline networks directly to households.
3. PNG is lighter than air and disperses quickly in case of leakage.

Which of the statements given above is/are correct?

- (a) 2 and 3 only
- (b) 1 and 2 only
- (c) 1 only
- (d) 1, 2 and 3

Answer: (a)

PMAY-G 2.0 Features

- Target to construct additional houses to achieve saturation.
- Emphasis on transparency, technology, and convergence.
- Uses digital platforms for monitoring and fund transfer.

Beneficiary Selection

- Based on Socio-Economic Caste Census (SECC) data.
- Verified by Gram Sabha.
- Priority given to homeless and those living in kutcha houses.

Financial Assistance

- Plain areas: Cost shared in 60:40 ratio (Centre:State).
- Hilly/Northeastern areas: 90:10 ratio.
- Union Territories: 100% funded by Centre.
- Beneficiaries receive assistance through Direct Benefit Transfer (DBT).

Technology Integration

- Use of geo-tagging for monitoring construction.
- Aadhaar-based authentication for beneficiaries.
- Mobile applications for real-time tracking.
- AI-based systems to detect irregularities.

Convergence with Other Schemes

- Linked with:
 - Swachh Bharat Mission (toilets)
 - Ujjwala Yojana (LPG connection)
 - Jal Jeevan Mission (tap water)
 - MGNREGA (labour support)

Achievements

- Crores of houses constructed since

**PRADHAN MANTRI
AWAAS YOJANA**

GRAMIN (PMAY-G) 2.0

Context

- PMAY-G 2.0 aims to provide pucca houses with basic amenities to all eligible rural households.
- It is part of the Government of India's vision of "Housing for All".

Background of PMAY-G

- Launched in 2016 replacing Indira Awaas Yojana.
- Focuses on providing durable and quality housing in rural areas.
- Targets poor and vulnerable sections.



launch.

- Improvement in rural living standards.
 - Enhanced dignity and social security.
- Challenges**
- Outdated SECC data leading to exclusion errors.
 - Rising construction costs.
 - Delays in fund disbursement.
 - Regional disparities in implementation.

Significance

- Promotes inclusive development.
- Strengthens rural infrastructure.
- Generates employment opportunities.
- Empowers women (houses often in female name).
- Update beneficiary database.
- Increase financial support to match rising costs.
- Strengthen monitoring mechanisms.
- Improve last-mile delivery.

Conclusion

• PMAY-G 2.0 is a crucial step towards rural transformation by ensuring housing security, dignity, and improved quality of life. Effective implementation and addressing challenges will determine its long-term success.

Prelims Practice Question

Q. With reference to PMAY-G, consider the following statements:

1. Beneficiaries are selected using SECC data.
2. It is fully funded by the Central Government in all states.
3. It uses geo-tagging for monitoring construction.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 2 and 3 only
- (c) 1 only
- (d) 1, 2 and 3

Answer: (a)

INS ARIDHAMAN (SSBN)

– Nuclear-Powered Ballistic Missile Submarine :

Context

- India has inducted INS Aridhaman, a nuclear-powered ballistic missile submarine (SSBN), strengthening its maritime deterrence capability.
- It is part of India's effort to build a credible nuclear triad.

What is SSBN?

- SSBN stands for Ship Submersible Ballistic Nuclear.
- It is a nuclear-powered submarine equipped with nuclear ballistic missiles.
- It forms the sea-based leg of the nuclear triad.

Nuclear Triad

- **Nuclear triad consists of:**
 - Land-based missiles
 - Air-delivered nuclear weapons
 - Sea-based nuclear weapons (SSBNs)
- It ensures credible second-strike capability.

About INS Aridhaman

- INS Aridhaman is the third submarine in the Arihant-class.
- It is an indigenously developed nuclear-powered submarine.
- Developed under the Advanced Technology Vessel (ATV) project.
- It has higher displacement and improved

capabilities compared to INS Arihant.

Technical Features

- Powered by a nuclear reactor enabling long endurance underwater.
- Can remain submerged for extended durations.
- Equipped with advanced stealth features to avoid detection.
- Capable of carrying Submarine-Launched Ballistic Missiles (SLBMs).

Missile Capability

- Can carry K-series missiles:
 - K-15 (short range)
 - K-4 (intermediate range)
- Future integration of longer-range missiles is expected.

Strategic Significance

- Enhances India's second-strike capability.
- Strengthens nuclear deterrence posture.
- Ensures survivability of nuclear assets.
- Contributes to stability in the Indo-Pacific region.

Indigenous Development

- Built under the ATV project with significant indigenous technology.
- Demonstrates India's capability in advanced naval engineering.
- Reduces dependence on foreign technology.

Challenges

- High cost of development and maintenance.

- Technological complexity.
- Need for secure communication systems underwater.
- Requirement of highly trained personnel.

Significance for India

- Strengthens maritime security.
- Enhances strategic autonomy.
- Positions India as a major naval power.
- Supports India's role in Indo-Pacific security architecture.

Conclusion

- INS Aridhaman marks a significant milestone in India's defence capability by strengthening the sea-based nuclear deterrent. It enhances strategic stability and reinforces India's position as a credible nuclear power with a robust second-strike capability.

Prelims Practice Question

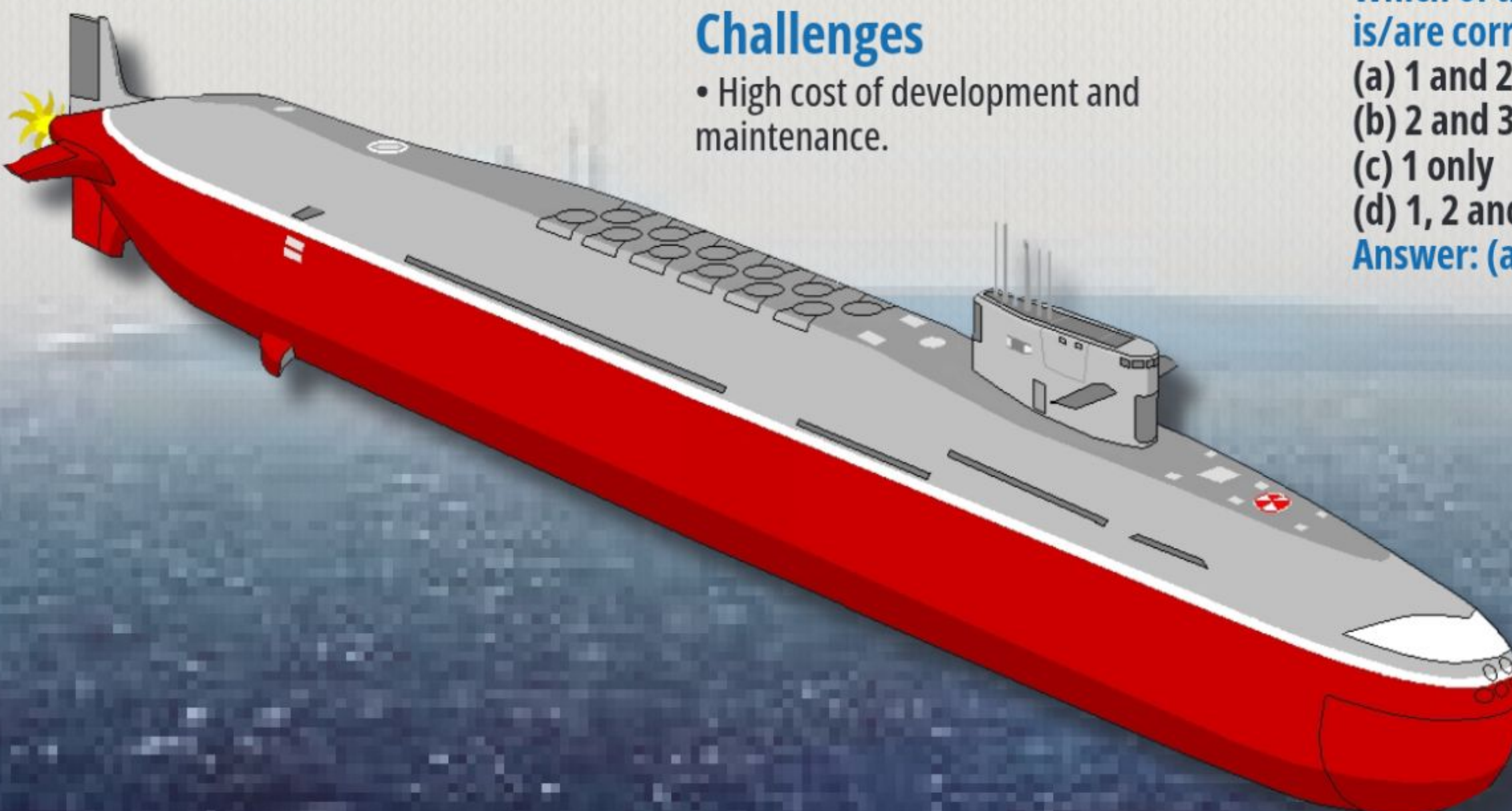
Q. With reference to nuclear submarines, consider the following statements:

1. SSBNs are capable of launching ballistic missiles from underwater.
2. Nuclear submarines can remain submerged for long durations without surfacing.
3. SSBNs are part of the air-based component of nuclear triad.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 only
- (d) 1, 2 and 3

Answer: (a)



INDIAN NAVY HOSTED IONS IMEX TTX 2026

Exercise Overview

- Indian Navy conducted IONS Maritime Exercise (IMEX) Table Top Exercise (TTX) 2026 at Maritime Warfare Centre, Southern Naval Command, Kochi on March 27, 2026.
- Participation from 12 countries: Bangladesh, France, Indonesia, Kenya, Maldives, Mauritius, Myanmar, Seychelles, Singapore, Sri Lanka, Tanzania, Timor-Leste.
- Focus on non-traditional maritime threats:
 - Piracy
 - Maritime terrorism
 - Illegal trafficking
- These threats impact global trade routes and energy security flows.

IONS Background

- Indian Ocean Naval Symposium (IONS) launched in 2008 by Indian Navy.
- It is a voluntary and cooperative maritime security initiative.
- Objectives:
 - Counter-piracy operations
 - Combating maritime crime
 - Humanitarian Assistance and Disaster Relief (HADR)
 - Information sharing
 - Enhancing interoperability
 - Maritime domain awareness
- Structure:
 - 25 member nations
 - Divided into 4 sub-regions:
 - South Asian Littorals
 - West Asian Littorals
 - East African Littorals
 - South East Asian & Australian Littorals
- Observers include countries like Philippines (joined 2026), China, Germany, Italy, Japan, Russia, Spain.

India's Chairmanship

(2026–2028)

- India assumed IONS Chairmanship after 16 years.
- IMEX TTX 2026 is a key milestone under India's leadership.
- Key initiatives proposed by India:
 - Full-scale IONS Maritime Exercise (IMEX)
 - IOS SAGAR deployments with IONS personnel
 - Maritime Information Sharing Workshops
- 9th IONS Conclave of Chiefs:
 - Held in Visakhapatnam on February 20, 2026
 - Participation from 33 countries
 - Focus on maritime security dialogue

Exercise Format and Benefits

- Table Top Exercise (TTX) uses simulation-based scenarios.
- No real deployment; crisis situations are simulated.
- Advantages:
 - Safe and controlled environment
 - Multi-scenario contingency analysis
 - Enhances coordination among navies
- Outcomes:
 - Builds mutual trust
 - Improves crisis response mechanisms
 - Strengthens interoperability
 - Enhances multinational cooperation

Strategic Significance for India

- Supports India's MAHASAGAR vision:
 - Mutual and Holistic Advancement for Security and Growth Across Regions
- Reinforces India as "Net Security Provider" in Indian Ocean Region (IOR).
- Promotes:
 - Regional cooperation

- Collective maritime security
- Stability of Sea Lines of Communication (SLOCs)
- Aligns with major naval engagements:
 - International Fleet Review 2026
 - MILAN 2026 (Visakhapatnam)

Overall Importance

- Addresses hybrid and non-traditional maritime threats.
- Strengthens regional maritime governance.
- Enhances India's diplomatic and strategic influence in IOR.
- Promotes rules-based maritime order.

Conclusion

IMEX TTX 2026 showcases India's rising maritime leadership through simulation-driven multilateral cooperation, building trust, interoperability, and collective security in the Indian Ocean Region.

Prelims PYQ

Q. With reference to 'Indian Ocean Naval Symposium (IONS)', consider the following statements:

1. Inaugurating the first IONS, Flag Officer Commanding-in-Chief Homi Bhabha declared: "The Indian Ocean is our area of responsibility."
2. IONS is a bilateral forum with participation of 8 countries.
3. IONS started operational drills for training of navies of member countries.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Answer: (a)

Context

- India is strengthening Plastic Waste Management Rules to tackle rising plastic pollution and promote a circular economy.
- Recent updates focus on stricter compliance, Extended Producer Responsibility (EPR), and use of recycled plastics.

Evolution of Rules

- Plastic Waste Management Rules, 2016 introduced segregation, collection, and responsibilities.
- Amendments in 2018 and later years expanded scope and accountability.
- 2021–2022 rules focused on banning identified single-use plastics.
- Latest direction towards 2026 emphasizes circular economy and mandatory recycling.

Extended Producer Responsibility (EPR)

- Producers, importers, and brand owners are responsible for plastic waste management.
- They must collect and process plastic waste equivalent to what they introduce in the market.
- EPR certificates and digital tracking systems are used for monitoring compliance.

Categories of Plastic Packaging

- Plastic packaging is divided into categories for regulation:
 - Rigid plastic packaging
 - Flexible plastic packaging
 - Multi-layered plastic
- Different recycling targets are assigned to each category.

Recycling Targets

- Gradual increase in mandatory recycling targets over time.
- Emphasis on reuse and recycling rather than disposal.
- Promotion of environmentally sound waste processing methods.

Mandatory Use of

Recycled Plastic

- New rules encourage or mandate use of recycled plastic in packaging.
- This reduces dependence on virgin plastic material.
- Supports circular economy principles.

Ban on Single-Use Plastics

- Identified single-use plastic items have been banned.
- Includes items with low utility and high littering potential.
- Enforcement strengthened through penalties and monitoring.

Digital Monitoring and Compliance

- Online portals track production, recycling, and waste management.
- Ensures transparency and accountability.
- Reduces chances of non-compliance and fraud.

Environmental Significance

- Reduces plastic pollution in land and water bodies.
- Protects marine ecosystems and biodiversity.
- Reduces greenhouse gas emissions linked to plastic production.

Challenges

- Lack of adequate recycling infrastructure.
- Informal sector integration issues.
- Enforcement gaps at local levels.
- High cost of alternatives to plastic.

Way Forward

- Strengthen infrastructure for waste collection and recycling.

- Promote biodegradable and sustainable alternatives.
- Enhance public awareness and behavioural change.
- Integrate informal waste pickers into formal system.

Significance for India

- Supports sustainable development goals (SDGs).
- Promotes circular economy model.
- Improves environmental governance and accountability.

Conclusion

- Plastic Waste Management Rules are evolving towards a comprehensive circular economy framework that emphasizes responsibility, recycling, and sustainability. Effective implementation and stakeholder participation are essential to address plastic pollution challenges in India.

Prelims Practice Question

Q. With reference to Plastic Waste Management Rules in India, consider the following statements:

1. Extended Producer Responsibility makes producers responsible for managing plastic waste.
2. Single-use plastics have been completely banned without exceptions.
3. Recycling targets are assigned to different categories of plastic packaging.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 2 and 3 only
- (c) 1 only
- (d) 1, 2 and 3

Answer: (a)

PLASTIC WASTE MANAGEMENT RULES (Amendment 2026)



Rice's Whale:



Rice's whale (*Balaenoptera ricei*) belongs to the baleen whale family Balaenopteridae and was recognized as a distinct species in 2021 after genetic, morphological, and acoustic studies separated it from Bryde's whale. Previously known as the Gulf of Mexico whale or a Bryde's whale subpopulation, it was first documented scientifically by cetologist Dale W. Rice in 1965, and the species honors his contributions. Historical whaling records from the 18th and 19th centuries mention at least 50 encounters with "finbacks" in the Gulf of Mexico, likely referring to this species, indicating a wider past distribution.

Physical Features

- Rice's whale measures up to 12.65 meters in length and weighs up to 27.2 metric tons.
- It has a streamlined sleek body with a dark charcoal gray dorsal side and a pale to pinkish underside.
- It features three prominent ridges on the rostrum in front of the blowholes.
- It has slender pointed pectoral fins and a broad falcate dorsal fin located two-thirds back from the snout.
- It possesses 44 to 54 ventral throat pleats.
- The skull shows unique nasal bone structure where frontal bones wrap around, creating wider gaps distinguishing it from Bryde's whale.
- Baleen plates number between 230-290 with cream to black coloring.

Habitat and Distribution

- Rice's whale resides year-round in the northern Gulf of Mexico.
- It is primarily found along the continental

- slope at depths of 150-410 meters.
- It is concentrated in the northeastern region near DeSoto Canyon off western Florida, Alabama, and Louisiana.
- It shows diel vertical diving behavior—deep foraging during the day (up to 271 meters) and near-surface presence at night.
- It is non-migratory unlike many other baleen whales.
- It depends on prey like lanternfish, hatchetfish, and silver-rag driftnet.

Ecology and Behavior

- It produces unique vocalizations such as long-moans (20-27 seconds, 43-208 Hz), tonal sequences, and downsweep variations.
- It averages about 22 calls per day, distinct from Bryde's whale.
- It travels at speeds of 1.2–6.3 km/h.
- It is usually solitary or found in pairs, occasionally in loose feeding groups.
- It has low genetic diversity, increasing vulnerability.
- Feeding occurs via lunge feeding at depth.
- Potential predators include killer whales and great white sharks (no confirmed observations).

Conservation Status

- Classified as Critically Endangered by the IUCN Red List.
- Population is estimated at fewer than 100 individuals, with some estimates as low as 33 or 16 mature individuals.
- Protected under the U.S. Endangered Species Act (2019) and Marine Mammal Protection Act.
- No officially designated critical habitat yet, though proposals exist (approx. 28,270

square miles).

- NOAA Fisheries has developed a recovery plan and conducts vessel risk assessments.
- Collaboration with BOEM for oil and gas mitigation measures (speed limits, 500m distance rules).

Major Threats

- Vessel strikes due to nighttime surface behavior.
- Oil spills (notably Deepwater Horizon 2010), which affected ~48% habitat and killed ~22% population.
- Noise pollution from seismic surveys (up to 260 dB) and shipping traffic.
- Fishing gear entanglement and marine debris ingestion.
- Climate change affecting prey availability.
- Policy risks: March 31, 2026 exemption of oil/gas activities from ESA requirements increases extinction risk.

Conclusion

Rice's whale is one of the rarest cetaceans globally, restricted to a small region in the Gulf of Mexico with critically low population levels. It faces severe anthropogenic threats such as oil exploration, vessel strikes, and pollution, making urgent conservation measures essential.

PYQ (Prelims)

Question: Rice's whale, that was recently seen in news, is endemic to which region?

- Gulf of Mexico
- Arabian Sea
- Bay of Bengal
- Pacific Ocean

Answer: (a) Gulf of Mexico